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REPORT
OF THE
PROCEEDINGS
OF THE
NATIONAL CONFERENCE
ON
INFANTILE MORTALITY

HELD AT WESTMINSTER, 13th & 14th June, 1906.

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REPORT OF THE PROCEEDINGS OF THE NATIONAL CONFERENCE ON INFANTILE MORTALITY, HELD IN THE CAXTON HALL, WESTMINSTER, ON THE 13th AND 14th JUNE, 1906.

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PREFACE.

A SINGLE word of introduction only is necessary in order to explain the origin of the Conference whose transactions are recorded in the following pages. In October, 1905, an International Congress on the functions of Infants' Milk Depôts was held in Paris, and among others present from this country were the Mayor of Huddersfield and the Chairman of the Health Committee of Glasgow. So deeply impressed were the British visitors with the vigour with which France is attacking the question of Infantile Mortality, and so great seemed to them the contrast which this presented with the apathy towards the question existing at that time in their own country, that a requisition somewhat in the form of a round-robin was prepared by the others, and addressed to the representatives of the Corporations named, suggesting that they should take steps to convene a National Conference on the subject if they could obtain the approval of their respective authorities. The Conference, of which this volume is a record, is the outcome of that requisition.

Regarding the contents of the volume, it cannot be suggested that all phases of Infantile Mortality have been covered in the course of the two days' discussion, nor that the aspects of the question discussed represent a complete statement of its causes. It is sufficient to have obtained public recognition of the excessive infant death rate and of the fact that, although some of its causes are so obvious as to need little more than recognition in order to be removed, in essence it arises from causes which lie deep in the social and economic conditions of the people.

It was with a view to inciting active work in all directions that the Congress was convened, and the Committee feel profound gratification in the conviction that, to some extent, the main object has been accomplished.

CAXTON HALL, WESTMINSTER,
June, 1906.

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NATIONAL CONFERENCE ON INFANTILE MORTALITY.

Under the patronage of their Majesties King Edward VII. and Queen Alexandra, a National Conference on the subject of Infant Mortality was held on Wednesday and Thursday, 13th and 14th June, 1906, at the Caxton Halls, Victoria Street, Westminster, S.W., lent by the Westminster City Council. The President of the Conference was the Right Hon. John Burns, M.P., President of the Local Government Board; the Chairman, Alderman Evan Spicer, M.P., the Chairman of the London County Council; and the Vice-Chairman, the Hon. Lord Provost of Glasgow (William Bilsland, Esq.).

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John, Mrs. Marcella, Rose Cottage, King's Langley.
Jones, Miss Mildred G., Town Hall, Rosebery Avenue, E.C.
Long, Miss K. L., 1, Hugenot Place, East Hill, S.W.
Lovibond, Miss F. R. F., 197, High Holborn, W.C.
MacKay, Miss A. Boyd, The Red House, Bootham Terr., York
McNamara, Mrs., Clontarf, Herne Hill, S.E.
Meyer, Mrs. Carl, 35, Hill Street, W.
Morris, Miss E. M., 24, College Grove Road, Wakefield.
Murphy, Lady Shirley, London.
Nicolas, Miss, 112, Harrow Road, W.
O'Kell, Miss L. M., 112, Harrow Road, W.
Orange, Miss Enid, Oakhurst, Godalming.
Pilley, John, Crescent Lodge, Camberwell Grove, S.E.

Pole, Miss, Guildhall, E.C.
Potter, Miss F., Municipal Offices, Chatham.
Power, Miss, London.
Pritchard, Eric, M.D., 14, Cromwell Place, S.W.
Pye, Miss, Priest Hill, Limpsfield.
Ravenhill, Miss Alice, 252, Lauderdale Mansions, Maida Vale, W.
Saleeby, C. W., M.D., 13, Greville Place, St. John's Wood, N.W.
Schooling, T., Actuary, Prudential Assurance Co., Holborn Bars, E.C.
Sinclair, Sir Wm. Japp, Garvock, Dudley Road, Whalley Range, Manchester.
Smith, Miss Annie, 60, Burlington Road, Bayswater, W.
Smith, Miss Constance, London.
Squire, Miss, London.
Williams, Miss L. Buckley, Public Health Office, Acton, W.
Wilson, Miss, 10, South Hill Park Gardens, N.W.
Woodhead, Professor Sims, Pathological Laboratory Museums, Cambridge.
Yates, Miss, 182, Regent's Park Road, N.W.
Young, Mrs., Town Hall, Lavender Hill, S.W.

FIRST DAY—MORNING SESSION.

Alderman Evan Spicer, M.P., took the chair, being supported on the platform by the Right Hon. John Burns, M.P., President of the Local Government Board; Mr. Herbert Samuel, M.P., Under-Secretary for the Home Department; the Earl of Harrowby, Sir Lauder Brunton, Sir Michael Foster, Sir Shirley Murphy, Medical Officer of Health for the County of London; Dr. R. M. Beaton, Chairman of the Public Health Committee of the London County Council; Mrs. Garrett Anderson, Dr. Leslie Mackenzie, Dr. Tatham, Mr. J. S. Fletcher, Dr. R. Caton, the Lord Provost of Glasgow, the Lord Mayor of York, Councillor Heald (Leeds), etc., etc.

PRESIDENT'S INAUGURAL ADDRESS.

The CHAIRMAN formally introduced the President of the Conference.

THE RIGHT HON. JOHN BURNS, M.P.—Mr. Chairman, ladies and gentlemen,—The pleasant duty devolves upon me as President of the Local Government Board to welcome you to this useful, necessary, and, in my judgment, too long delayed conference. On behalf of the royal patrons of this conference, the Government, and our department, we extend to you a cordial welcome, and in so doing express sympathy for your object, co-operation with you in your practical aims, and I promise you officially to render you what practical, kindly, sensible help our department can afford you in carrying out the objects which you have in view. Personally, I expect more from the discussion of this subject that has brought you together, from the education and enlightenment that springs therefrom, than I do from immediate municipal aid or legislative help. But all are needed, some of them are here, others outside have got to be secured, and in the formation of the public opinion essential to the changes you seek I look increasingly to the members of the medical profession, to the medical officers of health, to the sanitary and lady inspectors, and last, but not least, to the well-informed, courageous medical journalism that has made this subject a special feature during the last ten years. The seriousness of the subject increases every day. The grisly fact of infants dying before their time is an appeal to action that no one can resist, but the condition of their dying evokes more pity and sympathy than the death itself. The preventability of it all is a reproach to us, and a striking commentary on this fact, that is, as wealth increases the infants decay; and we have got to recognise the symptoms that have brought this conference together. I trust, hope and believe that the pity, the folly, the waste, and the tragedy of what is revealed in Dr. Newman's excellent book, in Dr. Newsholme's instructive work, and in the work of men like Niven, McCleary, and a score of other good and true men and women who have made this a subject of their special care shall not continue. I think I am well within the mark when I say that there are roughly 100,000 infantile lives being sacrificed in some form or another every year, not to man's inhumanity, but to neglect, carelessness, foolishness, and ignorance. If that be true, we have got to take steps to terminate that condition of things as soon as possible. It is sad for us to know that there are as many deaths under one year, in the first year of age, as there are in the succeeding eighteen. Now, I do not believe that is either a dispensation of nature or an ordinance of man. It is still more pathetic to know that in some districts from 30 to 60 per cent. of the children born die under five years of age, and it is not pleasant to read in this morning's papers the extract from Dr. Orme Dudfield's report which discloses this fact, that 11 per 1,000 is the general death rate for the rich and royal borough of Kensington, whilst in some portions of it the special district death rate ranges from 40 to 50 per 1,000, as against 11 elsewhere in the same parish; in some special districts in that particular borough the infant mortality runs up—in a limited area, I admit, but if limited the more easily remedied, in my judgment—to as high as from 300 to 400 per 1,000 per annum. These figures are in themselves sufficient. I won't trouble you with more. But we have got to consider our subject in the light of another phase of the same question. We notice that during the last fifteen years the general birth rate, which must not be ignored in the consideration of infant mortality and its causes, has dropped from 34 to 28 per 1,000. I am glad to say, and sanitarians have every reason to congratulate themselves upon the fact, that, whilst the birth rate has dropped from 34 to 28 per 1,000, the general death rate has dropped from 22 to 16 per 1,000. Well, it seems to me that the same causes that have operated in reducing the general death rate for the grown child, the youth, and the adult, and even for the aged, the same causes, the same impulses, diverted or more concentrated on the infantile death rate, ought to be able in the next ten years to bring about a similar result. I speak now as an engineer, as a member of a great society numbering 100,000 men, and here is a very cheerful and remarkable fact, that in fifty years, through many causes, partly high wages, cheaper food, better housing, shorter hours, increasing intelligence, and growing sobriety on the part of the engineer, the average age at death of engineers has been extended by ten or twelve years. Wives also have extended their age in the same period, but not quite so much, and never will, because that is the penalty woman pays for being the creator of us all. It is a burden she cannot altogether dispense with, and perhaps it is well that altogether she should not—yes, for it is only by sacrifice that we live and we learn and we work and transmit. In that period of fifty years, however, the infant mortality has been stationary or slowly declining. Now, it does seem to me, if men and women are sufficiently selfish and self-centred to devise and co-operate with others in extending by twelve years the working period of their own lives, it devolves upon them, in my judgment, consequentially, and more so by virtue of the fact that they are parents, that they should still more concentrate on helping the helpless whom both of them bring into the world. Now I do not take a despondent view on this subject. I believe that signs are coming that we have witnessed the bottom curve, so to speak, or, if you like to put it diagrammatically, the top curve, of infantile mortality. I am convinced of this, that this conference, which I trust may be so potent, will have as one of its direct or indirect results the reduction of infantile mortality between now and the next five or ten years by anything between 25 and 33 per cent. That result I believe you have a right to aim at, and it is something which I believe is possible in the light of the general death rate for you to achieve. Now what comes in upon me at this moment, Mr. Chairman, is this: what are the reasons of this infantile mortality being what it is? What are the causes? Wealth has increased, but the infant has not shared in it; physical comforts undoubtedly have enlarged, yet the weakest, the smallest, and the dearest to us all alone bear unduly the penalty and the burden of death. Now does progress—I mean material progress, not always the best criterion of a nation's advancement—does material progress hit the child too severely? If so, we are to find out the source from which the blows come. Or is it the mother, through causes we need not dilate upon, registering through her offspring a decline of race fecundity. Or is it due to nervous excitements and diversions that prevent both the number and the quality of the children that in more simple times we perhaps were able to produce? It may be, Mr. Chairman, that in equal parts the mother, society, and industry are mutually and jointly responsible. Whatever be the causes or the chief causes, the child is not to blame. Well then, if the child is not to blame, society is, and mothers and husbands and industry are. I believe, and you do, too, that two out of four infantile deaths are preventable. You have met to say that that is so. Your inclination is to say that it shall cease, and this conference has determined to arrange for that happy consummation and that beneficent result. Now, in going through this subject one is struck with one or two cheering facts. First, illegitimate infants, amongst whom there is an awful mortality, are declining fast, and are not so numerous proportionately or in the aggregate as they were. This is good in itself, but, as affecting the general infantile death rate, an examination of the illegitimate birth rate, and above all the illegitimate death rate—which is barely less than twice that of the legitimate—is beginning to reveal certain things that the publicist, the moralist, and the doctor must deal with. I am afraid that too often the illegitimate child bears the burden of the parents' delinquency, and often I am afraid the child suffers from the harsh verdict that society puts upon the too often unguarded, isolated, and unprotected mother. If that be true, we have got to temper the wind to the shorn lamb, and although the illegitimate death rate is double that of the legitimate, we must see that when woman sins the sin is not visited upon her offspring to the permanent damage of the child, and incidentally to the permanent discredit of the community. There is another thing that is revealed in looking at this subject, and it is that infantile deaths due to certain vicious, sensuous, and immoral causes are also declining. Over the whole field of infantile life, except to the extent to which it is circumscribed by infantile death, in my judgment there is no reason for despair or despondency. But I do think, Mr. Chairman, that sufficient emphasis has not been laid on what I may term the non-maternal or the non-medical causes in the prevention of infantile mortality. I am glad to say that during the last two or three years, when the tendency of infantile mortality, broadly speaking, is to show a happy decline, that decline synchronises with the rapidly increasing sobriety of the nation as a whole. Sobriety is increasing, and I believe it will rapidly and in the near future disproportionately increase. Our liquor bill this year is six millions less than last year and twenty-two millions less than five years ago. If it is fifty millions less ten years hence than it is at this moment, I venture to predict that infantile mortality in certain districts will be 70 per cent. less likewise. We must not altogether forget that increasing pleasure amongst certain sections of the community, and of course the ladies, and the growth of physical exercises, developing in proportion as they both are, are not always so good to the woman as a mother as it is to her as a recreative individual. Certain it is in my judgment that disproportionate pleasure, undisciplined physical exercises, for a woman does not tend towards a maintenance of the old-fashioned birth rate; but if with a diminished birth rate we get stronger mothers, happier husbands, and, as a consequence, healthier children and a more prosperous community as a direct result of both, although fewer in number, I won't grumble. I believe that a man's physique begins with his grandmother. That is my view, and I think Napoleon was right when, after being beaten on a celebrated field of battle by soldiers who mostly came from country districts, and who did not know what a comforter was, and who did not know what canned meat was, who played in the open air, and were breast-fed in the only decent and proper way by their mothers, he on the morrow of his defeat said, "Oh, those English mothers!" So I say, and it is to the mother that we have increasingly to look in this matter. Now, Mr. Chairman, I want to add another word if I may on the question of drink. Infantile mortality, apart from epidemic causes, too often corresponds with the drunkenness that accompanies full employment, high wages disproportionately and stupidly spent, and consequently the abuse of both wages and employment. We cannot ignore the fact that often when trade fails and work is slack, and even when wages are low and intermittent, the death rate among children drops down. We cannot avoid the illustration of the cotton famine, the siege of Paris, and many other instances that you may know of perhaps better than I do. Bad though liquor is to the child, penalising as it is to the father, alcohol in the mother, especially in the expectant mother, is one of the most serious tragedies that society is confronted with. It not only produces sterility, abortion, and premature and still births, but what is worse and more pathetic to me, debility in the children who survive the alcoholic impregnation. There is the poignant tragedy of the might have been blighted by maternal indiscretion ere active life had come. Sadder, too, to me, is this fact, that children of alcoholic or even drunken or heavy drinking parents are permanently handicapped in the race of life, probably for thirty, forty, or fifty years, simply because of the transient folly and the temporary satisfaction of one of the most stupid and physically demoralising appetites that we as a nation are cursed with in nearly all classes of society. It is not an accident that the deaths from overlaying of infants are twice as high on Saturday nights as on any other night of the week, that Monday comes next in the death roll, and that Sunday is third. I believe that these things point unmistakably to the fact that as the means for intoxication are provided so are the abuse and the results of intoxication proved. Another cause in my judgment of infant mortality, and I speak with some experience on it, is married women at work. This, as figures prove, is a fruitful cause, and in some districts doubles the whole death rate of the neighbourhood. It is bad that the children should die, as I said before, but what are we to expect of the children whilst the mother is nine or ten hours a day, even sometimes twelve hours, away from her home in a factory, having the child taken to her at times to suckle if she is wise enough, as I hope increasingly they will be, in her meal hour, when really she ought to be resting, not suckling her child in a factory yard or in a stuffy workshop, but at home probably in a recumbent position, being alone what a mother can be in decent human conditions? But the effect of this married women's work in certain districts on the children who live to a great extent is responsible for the gangs of happily decreasing anæmic, saucy, vulgar, ignorant, cigarette-smoking hooligans who are in the street because a mother's influence and restraining care was not with them for sixty out of the eighty hours that daylight was with them when they were younger and their mothers were at work. What is worse, look upon the effect on food preparation and management at table, and the discipline of the mother on the whole family. I had a good mother; she did not go out to work, because I had a good father. She had enough to do looking after us. When I inform this conference that I am the sixteenth out of eighteen, and that nine of us survive, you may have some idea how my mother was occupied. Now as to the effect of this on the children, if I may, in a word or two. I know of no influence on youthful lives so great as that of the mother at the head of a table, and her children around her, and the father coming home regularly to his meals from his work or the factory. The amenities of a well-ordered dinner table are a liberal education when young, as through the well-ordered physical the mental and the moral are produced in character and disposition. We learn more in the seminary of the workman's kitchen than we do either at the continuation or the Polytechnic schools, or even at Eton and Harrow.

A pebble on the streamlet scant
  Will turn the course of many a river;
A dewdrop on the baby plant
  Will warp the giant oak for ever.

I am as convinced of this as I am standing here that what I owe in strength, what I owe in Spartan outlook upon life, is due to a poor home with the mother always there, in my infancy breast-fed, early to bed, boiled food, mostly Scotch mutton broth or Irish stew, and none of the tinned figments that pass muster to-day. But look at it from the husband's point of view. How much of the preventable drinking of the husband is due to the fact that when he comes home two miles from his work, and the wife comes from the mill perhaps at the same time as he does at night-time, there is no kindly figure in a white apron, or kindly face, or willing waiting hand, but too often a scramble on her part when she ought to be sitting down at the head of the table not to prepare, but to disburse the tea or even the midday meal for him! and when she cannot do it, as to their credit women do often against their strength attempt things that they ought not to be provoked to, she remits her domestic care of her children to proxies and substitutes who are often worse than the worst mothers would be if they were continually at home. We have got to restrict married women's labour as often and as soon as we can. What is more, we have got to tell the husband, as I now do as one who has been identified all my life with improving the wages of labour, that even where you can put the wife's and the husband's income together, speaking of labour as a whole and over the whole classes of industry that employ both men and women, the combined wages of husband and wife do work out rarely equal to the remuneration of a single male bread-winner who is determined to have a standard of comfort that will keep his wife at home and himself at work. Whether that be so or not, I put forward this modest proposal, that at once no married woman be allowed to go to work three months before her confinement, and I would support a proposal that no married woman be allowed to resume work till six months after it. Now, Mr. Chairman, may I give one or two instances? I will only give you one or two which I read in the Factory Inspector's Report for 1897 to 1898. I am delighted to see, and I know that you are all pleased to welcome, here the Under-Secretary for the Home Department, Mr. Herbert Samuel, who is upon the platform. I was looking through one of the reports of his department, and I found this remarkable thing. In one district—we need not name it—77 married women were engaged in work that was liable to give lead-poisoning, and here are the simple, the tragic annals of those 77 married women, the mothers of children. Of 77 married women suffering from lead-poisoning 15 were childless, 8 had 21 still-born children, 35 had miscarriages, and of 101 children who lived, not all of them a long while, 40 died in infancy. Now, you do not get many Sandows or Hackenschmidts out of those conditions, and the survivors would in many cases have been better beneath the sod than alive, because their life was more or less a funeral procession from the cradle to their premature grave. I repeat, Mr. Chairman, there is too much married women's labour, there is too much child labour, and in these days when men are out of work thereby, through women's and child labour, or in some cases voluntarily idle, we should face the facts. It is astonishing how married women's labour manufactures loafing, idle husbands. We do not want, as I know happens in three or four districts where laundries most prevail, laundresses toiling twelve or fourteen hours a day heavily in labour at their work up almost to the time of child-birth, whilst the husband is perhaps drinking round the corner, or acting as a bookmaker's tout, or buttressing a beershop, or french-polishing the outside of a public-house. No wonder that from 25 to 30 per cent. of the infantile deaths in a laundry district are due to overwork and cruel neglect and bad treatment of the married laundress, working but too frequently with the best intentions but doing the wrong thing for her children, and encouraging her husband if he is a voluntarily idle person to continue to neglect his wife and family! In every aspect her labour under these conditions is an individual mistake, a social tragedy, a communal blunder, and we have got to do our best, now that the engineer has made laundry work more or less a mechanical operation, to see that we have male launderers working for the women and children instead of the women neglecting their children, and too often keeping an idle husband in slothful ease. Now, I have one or two views neither practical nor directly legislative, but if I had my way by statute I would make drink in this connection an infectious disease. I would make poverty a statutory nuisance, and low wages for women an indictable offence. I make these suggestions from my department to the one with which Mr. Herbert Gladstone is connected, but if they want the Local Government Board to help their lame dogs over stiles, "Barkis is willing," and with your approval I can promise the Home Office your support. One word more with regard to this matter. Publicists as we are, we cannot help being more or less concerned—especially as we are advised by such a kindly, practical, and sympathetic corps of medical officers of health and statisticians, including the Registrar-General, whom I am glad to see here this morning—at the condition of married women at work, because we cannot help recognising under medical advice and guidance what the pre-natal conditions of children are. I believe at the bottom of infant mortality, high or low, is good or bad motherhood. Give us good motherhood and good pre-natal conditions, and I have no despair for the future of this or any other country. I believe what the pre-natal condition of the mother is, so her offspring will be. I believe that that is seven-eighths, perhaps nine-tenths, of the underlying cause that has brought you together to-day. Next to that, may I say that I go about this vast city night and day, mostly in the quarters of the poor, and there is not much cruelty where infant mortality prevails, I mean deliberate cruelty? What is more, I believe that in many cases excessive feeding is often more deadly than insufficient feeding. If we could get the statistics from the same number of mothers, say a thousand mothers, and what proportion of the first-born died as compared with the second-born, it might reveal the truth of what I am now suggesting, that very often it is stupid kindness and inexperience that kills. Certainly in my judgment excessive feeding is as deadly, in many cases more deadly, than insufficient feeding. I believe that improper feeding is still more dangerous, and I believe that ignorance is the cause more than cruelty. But whatever the causes are, eliminate the fact that

Shakespeare put in the pregnant phrase, "There is no darkness but ignorance," and whether it be cruelty, over-feeding, under-feeding, ignorance, stupidity, or improper feeding, I say it all results in preventable death, is "love's labour lost," and if this conference will bring about by any means better feeding, regular feeding, breast feeding, to a greater extent than now prevails we shall in a measure have achieved our object. I have one word to say upon bad feeding of children, if I may. I was staggered when I read the three or four excellent books that kindly doctors have sent me recently, some of them too late for me to dip into. I am as surprised as I am delighted at the bibliography of this important subject and its growth. In fact, if it goes on I shall have to ask for a rise in salary to enable me to add to my library. I read that the mortality of bottle-fed children is from ten to fifteen times more than that of breast-fed children. Well, I cannot help quoting in this connection the Medical Officer of Health for Birmingham. He had under review 3,000 babies who died, and of these 3,000 babies 8 per 1,000 only were breast-fed, 26 per 1,000 part breast and part bottle, and of those fed from the bottle only—it does not say what was in the bottle—252 per 1,000 died. It is twice as dangerous, says Dr. Newsholme (to whom we owe much on this subject), to feed infants on condensed milk as on fresh cows' milk, or it is fifty times as dangerous to feed infants on cows' milk, and one hundred times as dangerous to feed infants on condensed milk, as on mothers' milk. Well, if that be so, and it is, I leave it to you doctors, lady visitors, mayors, aldermen, and councillors, to devise some means by which this can be stopped within the ambit of your jurisdiction; and if your efforts are not sufficient you have a right to knock at the door of Parliament and to ask for legislative assistance. Now, Mr. Chairman, my last point is this: City conditions affect infant mortality. The large city is to a great extent responsible for our death rate. There is no place in the world where a man can be so utterly lost as in London, and there are no streets in the world where women can be so isolated and alone as they can be in many of the poor streets in this huge district. Now that symptomises itself in many ways. It deprives the expectant mother of that sisterly advice, that neighbourly communication, that you can get in the country, in the village, and in the smaller town. If through lack of sisterly regard, womanly communication, and experienced advice the big city destroys natural communication that ought to exist when women are in a certain condition which does not prevail in country and smaller towns, we have got to provide, either out of the rates or taxes or out of love of each other, some effective substitute for that which the city or large town kills. Can it be done? I think it can be done. I am going to quote one instance. May I quote my own parish? I only quote it because I know it. In thirty-five years Battersea has trebled its population and halved its death rate. That is very good. But in that period its birth rate has dropped from 42 to 27 per 1,000—a very significant decline. The infant mortality in the parish has dropped in ten years from 176 to 131; good, but not enough. What is the reason for these remarkable results in this parish? I will tell you one. It has fewer public-houses than many other parishes in London per 1,000 of the population. It has plenty of parks and open spaces; it has good sanitation; it has a sterilised municipal milk depôt; it has ten sanitary inspectors; it has a lady inspector who visits expectant mothers, and generally takes the place of a kindly experienced neighbour under other conditions and under certain circumstances. May I give another instance of how the sobriety, the absence of the public-house, the pawnshop, and the bookmaker, and all the other plagues of a poor district, operate when the workmen and their wives and children get a decent and human start? Four years ago we laid out an estate of artisans' dwellings—there is a doctor from the parish here now, and he will correct me if I am wrong—that estate has 1,500 men, women, and children living on it; there were 39 births at the rate of 26 per 1,000, and there were 15 deaths. The general death rate was 10 per 1,000 for the district of that artisans' colony, as against 13 or 14 for the whole of Battersea, and the rate of infant mortality for the 39 births was at the low figure of 77 per 1,000, as against 131 for the parish, and about 140 or 142 for the whole of London. Now I attribute much of that to the fact that the homes are clean; that every tenement at 7*s*. 6*d*. or 8*s*. 6*d*. has got a penny-in-the-slot electric light, and is supplied with a hot and cold water bath for the baby and for the children, and that it is a sober district. A lot of these children were not breast-fed, and where possible breast-feeding is better than municipal milk, but where it was not possible they had the command of milk from the sterilised milk depôt. Now, I want, Mr. Chairman, in conclusion to say what my remedies are for the condition of things which I have described, and others that I have passed over. First, concentrate on the mother. What the mother is the children are. The stream is no purer than the source. Let us glorify, dignify, and purify motherhood by every means in our power. Let us see to the nursing child in every way; nourish the mother, you feed the child. In every aspect of this subject let us have good mothering; that is at the bottom of happy healthy children. We have got to have better and cleaner milk than we now get. We have got to have cleaner homes, more sober homes. We have got to have fresh air both for the mother and for the baby. We have got to have paved back yards and impervious streets, and we have got to have cleanliness wherever we can get it. But we have got to keep our eyes on remedies that are plausible and illusory sometimes. I am for milk depôts wherever they can be tried. I hope to be able this year to bring in a little Bill to legalise municipal milk depôts, which have done so much good. Milk depôts are good, but not good enough, if they supersede or discourage breast feeding. Crêches may be all very well here and there. Personally I am against them, because I believe that crêches stimulate the growth and increase of married women's labour, and therefore I am not enamoured of them. We have got to have cheap food and plentiful food for the mother, and we are to have it clean, and whether it comes from the provinces or from foreign countries, we are going to see that we get it. But there is another thing that you have got to keep your eye on, and this is a matter for the ladies. I believe that fashions in many forms—I need not go into them—are beginning to interfere and to impair and to curtail maternal responsibility of some women both to the community and to their own children. The Bible says, " All is vanity and vexation of spirit " ; and when vanity, fashion, and capricious dress go too far, and to the extent of damaging the mother, or the expectant mother, in the quality and the sacred duty of child-bearing, it is time that fashion's decrees were put on one side and human nature more simply followed. One other and last thing, Mr. Chairman. As I came through the streets this morning I saw half a dozen " A division " policemen on duty, strong, clean, healthy fellows, and with all their idiosyncrasies ours is the best police force in the world. I am glad you country people recognise that—you are strangers, and we take you in! There was marching by them a company of Foot Guards, also straight, sturdy, healthy-looking fellows, but I noticed alongside both policemen and guardsmen fifty or sixty stunted anæmic young men on whom the lot of their married mothers' labour had fallen, on whom the burden of narrow homes, bad milk, insufficient food, and all the disabilities that poverty brings to a town population had pressed too heavily, and I could not help thinking, with this conference in my mind, What is the reason for the difference between the strong healthy guardsmen and policemen on the one side and the anæmic larrikin, hooligan, and cretin, a few of whom were among the number I saw? It was not wholly a matter of wages, because the guardsmen's fathers had on the average a lower wage in the country than the townsmen, but they had better conditions and purer air than the fathers of the diminutive chaps I saw this morning. As with the guardsmen, so with the policemen. It is not always wages that count in physique, but simplicity of life, open air, the practice of elementary virtues, early to bed, and the absence of stupid excitements that are mistakenly called pleasure in our towns and cities. All these are more or less responsible for the difference between the two sets of men. Well, just now we are talking of lots of things, about industry, commerce, and the necessities of the race. I have only to say in that connection that the bottom of industrial supremacy is the health of the operatives; without that you will have no supremacy. Strong physique, good constitutions, and the sober dispositions of your artisans are the foundation. You cannot have that which other people expect to get by political reform, municipal change, or fiscal change. Industry demands health; and health, I believe, in the main is a maternal gift; it is an infantile legacy; it is a good beginning, the best of all heritages, a sound constitution; for the individual health is a benefit, for the community a blessing, and for the State the greatest satisfaction and the best of all its possessions, powers, and privileges. I cannot help concluding what I have to say by quoting one of the most beautiful things ever written by an expectant mother, by an Irish woman, and I felt it deeply as I read it coming up in the tram from Battersea this morning by Battersea Park. This expectant mother, writing of the joy of her child that is to be, says:—

When my darling comes to me
He will lie upon my knee;
Though the earth should be my cradle,
He must know no harder place.
A queen's son may lie cold
In a cradle all of gold,
But my arm shall be around him,
And my kiss upon his face.

To make every expectant mother feel what that expectant mother expressed is my inclination, it is your duty, and may it be the beneficent result of this conference to preserve for the mother and retain for the community the lives of their offspring.

THE LORD PROVOST OF GLASGOW:—I have the agreeable duty assigned to me of asking you to accord what you have already done so heartily, our very sincere thanks to the President of the Local Government Board for his inspiring address this morning on a subject in which we are all deeply interested. It has very often been the experience of those working in municipal life that we have found it a very arduous task indeed to convince those who are at the head of official departments of the needs of our various communities; but I am sure everyone interested in the health of this nation would cordially wish that every member of the community were as advanced in their ideas on this subject as is the present President of the Local Government Board. I can assure Mr. John Burns that this Conference is in earnest on this subject. There never could have been this Conference but for the earnestness with which Municipal Health Committees and Medical Officers of Health have been addressing themselves to their duties, and it is in connection with the very complete statistics we have all over the country that the attention of the nation has been drawn to this very serious problem, in regard to which municipalities cannot make further progress without some help. We want first of all public feeling aroused, and we feel sure that the Presidential address this morning will be a very valuable contribution to that end. We can assure Mr. Burns that we who represent the various municipalities will seek to derive from this conference fresh inspiration to do the work that lies to our hand, and we will not fail to come to him to give us such legislation as seems in all the circumstances to be most desirable. In your name allow me to thank the President of the Local Government Board very sincerely for his most appropriate, inspiring, strenuous and sympathetic address, and to give him the assurance that that address will be helpful to secure the success of this conference.

Sir Michael Foster :—I am sure it needs no poor words of mine to express the great delight with which we have listened to the homely and lively, but wise, words of John Burns. I can assure him that we have all of us learnt something from what he has said. He has spoken as a man who knows what he is speaking about. If there were two things in what he has said to which I would draw attention, they are, first, that important as are the medical causes of infantile mortality no less are what Mr. John Burns call the non-medical causes of that mortality, and those non-medical causes are in many ways more within our grasp at the present time than the others. The second point is that the causes which lead to infant mortality do something more than that. Besides the loss of so many potential lives there is an evil almost as great perhaps, and that is that the causes which carry so many away leave so many behind unfitted for the life before them. Through all his address I have been thinking there is an Italian word which one hears occasionally—"simpatico." It has a very full meaning, but difficult to translate into English. "Sympathy" is a weak expression of it. Now the men and women like ourselves engaged in such a work as this who have to come into contact with the members of the Ministry, we always meet with extreme courtesy, and we frequently observe that the Minister is trying to say things to us as pleasant as he possibly can, but that he cannot go beyond a certain distance. It is only occasionally that we get anything like real sympathy. Now to-day with Mr. John Burns one can feel that one has to do with a man who is not only sympathetic in the English sense, but goes beyond that, and is wholly "simpatico" in the full Italian sense, and that we have moreover to deal with a man whose mind is broad enough, and alert enough, to grasp the real question before him, and one who has the courage to carry out that which he thinks ought to be carried out. I feel that to-day we feel more than ever how much we are indebted to the grandmother of John Burns. (Cheers.)

The motion having been carried with prolonged acclamation,

The Right Hon. John Burns, M.P., in acknowledgment, said: I am sincerely indebted to you for the kindly and unanimous vote of thanks you have passed to me. I must go now, but some of the sympathy which I have expressed to you I will do my best as opportunity offers to translate into action that will enable your work in the future to be much easier than it has been in the past. (Cheers.)

CHAIRMAN'S OPENING REMARKS.

The Chairman: It is not my intention to occupy your time beyond two or three minutes, because I feel that this Congress, which is one of the most important that has ever met in London—a congress which is needed more for London, I was going to say, than for any other part of the country—has much business to transact. We have gathered here to-day a large number of ladies and gentlemen who are experienced in the question of infant mortality, and it would be unwise for a man in the street to waste your time. But may I say, having been asked to preside over this conference owing to the fact that for the time being I am Chairman of the London County Council, I should like to give to our friends from the country a very hearty welcome into London. I can candidly say that I feel that this congress is already a success. We have had one of the most practical and one of the most thoughtful addresses from Mr. John Burns that we could ever have hoped to have had. We have the knowledge that Mr. John Burns is in authority as President of the Local Government Board; he occupies a great position, and a position in which he has the opportunity of dealing with those questions which the conference has to discuss. I think we may be thankful that we have had the opportunity of listening to Mr. John Burns, who has expressed himself so fully and so earnestly on this subject, in a way which I think the majority of those present agree with. This is going to be a business conference, and I trust that none of the delegates will be attracted by outside frivolities, but that they will give us their attendance throughout the congress so that the results which are arrived at may go out to the country, to the Government and to the community with authority, as coming from the most practical body of men and women ever brought together on the subject. I have no doubt the result will be the legislation that we all desire. (Applause.)

THE TEACHING IN SCHOOLS OF ELEMENTARY HYGIENE IN REFERENCE TO THE REARING OF INFANTS.

By Dr. NIVEN,

Medical Officer of Health, Manchester.

If we examine those figures in the Registrar-General's Annual Reports, which show the death-rates per 1,000 living, corrected for age and sex, at different groups of ages, in successive quinquennia, we find that, both for males and females, there has been since 1846-50 a steady diminution in the death-rates at ages between five and thirty-five, greatest at the ages five to twenty-five, at which period of life the death-rate has been reduced by more than 50 per cent. At later ages up to the two last quinquennia the death-rate has increased. At ages under five there has been a diminution, though less than that shown at succeeding periods of life. The infantile death-rate, however, has remained stationary.

At all ages there has been a steady diminution in the death-rate since the decade 1861-70.

The birth-rate has steadily declined since the decade 1871-80 at a still greater rate than the death-rate. In the result, the natural increase of the population is now less than it was twenty years ago.

The lowering of the death-rate in childhood, youth, and early adult life has, no doubt, been due to a combination of causes, chief of which are the increased prosperity of the community, advance in medical knowledge, the steady growth of preventive medicine and sanitary administration, the influence of public elementary schools, and factory legislation. We should expect that these influences would have impressed themselves on the infantile mortality, and, in fact, this has been the case in some respects.

If we analyse the infant mortality in trimesters we find that the mortality has increased in the first three months of life, while it has declined in the succeeding parts of the first year of life.

Our apprehensions are thus aroused that the decline in the birth-rate has occurred especially in the more prosperous portions of the community.

We are threatened, therefore, with a double deficit, in the quality no less than in the number of the population.

Every unit in the population is, thus, of importance, and it is essential to the nation that we should raise the physical condition, and the mental efficiency which depends on physical condition, to the highest point attainable.

For that purpose we must begin early.

The building up of a sound mind in a sound body must begin at birth, and we must even carry our efforts further back into the time when the infant is evolving healthily or otherwise according to the soundness of the mother's blood, which is its nutriment.

No step in the process from the fertilisation of the ovum to the point at which the young man or young woman steps forward to take his or her share in the work of the community is unimportant. Each stage is the cause of the next, the result being modified, it is true, by new conditions.

It cannot be doubted that infancy exerts a powerful influence on childhood, and that an infant who has suffered severely from malnutrition, diarrhœa, tuberculosis, or syphilis, enters childhood with a terrible leeway to make up.

It is not merely, then, our desire to reduce the infantile mortality which causes us to study this problem, but we are moved even more by the consideration that for every infant we can save, we shall raise the level of many others who might have pulled through, but not so successfully.

We may put aside the objection that we are striving to advantage the inferior part of our population at the expense of the finer elements. There are however, other answers to this objection.

One is that the higher organisation is frequently the most unstable at the outset. Indeed, it is plainly owing to the fact that the various organs are evolving under stress of hard work, that they are so accessible to attack at earlier ages. Hence, the more complicated the organ, the greater is the danger of its evolution being interfered with.

Then, again, it is largely due to industrial developments that the infantile death-rate is sustained. The girl who has become a weaver or spinner, a typist or a teacher, at an early age, has her energies fully occupied with her daily task, and when she becomes a mother, enters on her new life in a condition of profound ignorance. It is this absorption in work outside the home which marks off the present period, and sustains the infantile mortality. Yet we cannot doubt that skilled workers are essentially fine material from which to produce a good type of children, possessed as they must be of superior cerebral energy.

It is not possible to put back the hand of time, and to say that prior to wedlock the woman must be engaged in domestic work, while the man is pursuing his occupation, though the experience of the Jewish community in Manchester would appear to show that mothers may with advantage give their entire work to their households.

We must, therefore, seek for some means whereby the workers may enter on motherhood with a clear grasp of the duties which will fall to them, and of the means by which they may be performed.

The function of woman is to produce and rear children. No industrial change can alter that without destruction to the nation, and it may even be said that her duty and her happiness is to produce and rear healthy children, and that no nation can maintain its position, unless this duty is fulfilled.

It is a strange thing that such general ignorance on the part of young women of all that goes to make a home, of cooking, of cleaning, of the management of infants, of domestic thrift, of the value and price of foods, those things on which above all others the happiness of her family and their welfare depend, which are her proper and special sphere, should be allowed to exist.

What thought does a working town girl, who has left school, give to geography, history, grammar, nature study? She has not the necessary energy for it, if she desired to pursue such subjects. But the subjects which I have mentioned as needful for her home life she would love to learn if they were properly taught.

Is it because they are too difficult that they are not taught in all schools, as of all things most necessary? That is, perhaps, the root of the matter. It cannot be because their higher claims are not recognised, or because their educational value and dignity are not appreciated.

Assuredly there is no denying that to teach them well, and to learn them well, demands a higher capacity than is required in training girls in subjects which are not generally needed at any subsequent time.

I do not believe that our teachers, who must feel the great need for knowledge of that kind, will fail to rise to the occasion, or that able instructors will be wanting to guide them.

Of what advantage is it that girls should attend school from the age of five to the age of fourteen, if they are not to carry into their lives treasures of available knowledge, in addition to the power of reading, writing, and being able to do simple sums?

It is true that cooking and sewing are now taught in a number of large towns.

There, is, in fact, a growing body of opinion that the subjects desired to be taught constitute education in its proper sense, that is to say the drawing out of the proper faculties of girls, which ought to be cultivated, which would grow naturally under good training, and which would help to make them good wives and good mothers.

But these subjects require capacity and devotion, and the wants of the nation demand that they should have both, at the sacrifice, if necessary, of other subjects, valuable, it may be, in themselves.

Causes of a High Infantile Mortality.

We are not concerned at present, however, with the entire education of the future mothers in all that pertains to hygiene and domestic economy, but only with the kind of education which would enable them to do the best towards rearing their infants in health.

To that end the first step must be to ascertain what are the influences which act injuriously on infants.

We have seen that it is the continued maintenance of a high infantile mortality which has arrested attention. We may, then, usefully analyse this mortality, with a view to ascertain of what factors it consists, which may separately require consideration.

The convenience of approaching the subject from this point of view is well recognised in two reports on infantile mortality, one by Dr. Meredith Richards, and the other by Dr. John Robertson; while, in his most suggestive report on the same subject Dr. Moore, of Huddersfield, recognises the value of this classification.

Dr. John Tatham, in the Manchester Health Reports, also arranged a classification of the causes of infantile mortality, and tables based on this have been published annually since 1893.

From investigations on individual cases of fatal diarrhœa, it would seem that the causes of death may be conveniently classified in four or five groups thus:—

I. Premature birth and congenital defects.

II. Diseases mainly of digestive origin, wasting, diarrhœa, etc., tuberculosis.

III. Convulsions, which is closely allied to the preceding group.

IV. Respiratory disease.

V. Whooping cough, measles, etc.

The above is practically coincident with Dr. Richards' classification, and we can, therefore, give the subjoined comparative figures for England and Wales, Manchester, and Croydon.

Group II. includes atrophy and debility. The greater part of the deaths in this group, are, I believe, due to unskilful feeding, though a portion would also belong to Group I.

Group III. In this group the deaths are also due, in no small degree, to disorders of digestion, though the association is not so close as it is in the causes of death included under Group II.

DEATHS UNDER ONE YEAR PER 1,000 BIRTHS.

	England and Wales, 1892—1901.	Manchester Average, 1894—1903.	Croydon, 1900—1902.
Group I. . .	23·0[1]	21·7	29
„ II. . .	57·5	71·0	52
„ III. . .	17·8	10·1	10
„ IV. . .	25·3	33·0	23
„ V. . .	8·7	12·2[2]	8

It will be seen from the above that the excess in the infantile death-rate in Manchester, which city may be taken as typical of large centres of population, is the result chiefly of conditions subsequent to birth, being contained in the groups, digestive disorders, lung disease, and common infectious diseases.

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[1] These figures are from Dr. McCleary's paper in the *British Medical Journal*, August 13th, 1904.

[2] This figure includes deaths from common infectious diseases other than measles and whooping cough.

The high mortality from malnutrition and from diseases of the digestive tract brings home to us the necessity of a careful study of the conditions producing it.

By far the largest portion of the infantile death-rate is of digestive origin, while about equal amounts are due to developmental defects and respiratory disease. Next in order come the ordinary infectious diseases. In our endeavours to reduce the infant mortality we must consider first how the developmental group may be reduced by improving the condition of the mother.

Great stress was laid on this point by several of the witnesses before the Committee on Physical Deterioration, of whom I may specially mention Dr. Leslie Mackenzie, while Dr. Chalmers has given much attention to this subject. An excellent article by Dr. McCleary on ante-natal conditions in the *British Medical Journal* of August 13th, 1904, has already been quoted.

It seems probable that alcohol and other injurious drugs taken by the mother in excess injure the offspring, and it cannot be doubted that the condition of the mother and the regulation of her life must materially influence the development of the fœtus and its condition at birth.

As regards respiratory disease, the same observation may be made. With respect to both we would recall the enormous influence of dirt acting on such vital structures as the bowels and lungs, hard-worked as these necessarily are in the infant.

The connection between visible dirt, and that more fatal invisible dirt which assails weak organs, and grows on them, is one which every educated girl should thoroughly grasp.

We can now perceive the kind of education which the girl or young woman stands in need of, so that she may perform successfully the part of mother, or mother's help.

Before passing on to consider a scheme of education we may first briefly review the agencies available for the instruction of mothers at the present time.

Educational Agencies at present concerned with the Care of Infants.

The educational agencies specially dealing with the care of the infant may be classified thus:—

1. Hospitals and medical practitioners.
2. Nurses and district institutions.
3. Crêches.
4. Instructions provided by sanitary authorities or otherwise—
    - (*a*) By the medium of health visitors or lady missioners.
    - (*b*) By way of handbills sent out by the authority, and given to parents by the registrars of births and deaths, or delivered at the homes of the people.
5. More recently, instruction in schools.
6. Books like Ashby's "Health in the Nursery."
7. More recently, the Midwives Act offers a prospect of getting young mothers warned and instructed in the procedures needful to protect their offspring before and after birth, especially if trained and experienced nurses become midwives.
8. Municipal and other milk depôts are also being utilised as educational centres.

It can hardly be doubted that hospitals for diseases of children have done much valuable work in teaching parents what precautions are needful, especially in the feeding of children, but also in regard to contagious and other affections. I refer especially to the out-patient departments which have, to a certain extent, filled the part of consulting centres.

At the same time out-patient departments are not without dangers, and it may be a question whether additional care does not need to be exercised in the way of ascertaining the fitness of infants to be taken to out-patient departments of hospitals and dispensaries, and their freedom from infectious conditions.

As regards medical practitioners, the teaching of mothers is, at present, largely dependent on them, and the time at the disposal of those of them whose practice lies amongst the poor, is very short. Moreover, poor people do not readily call them in. They are not always able to bestow the amount of attention on the management of infants which the subject requires. There are thus limits to their usefulness. On the other hand, if they could get the mother to observe for them, their time would be saved, and they would be able to give her more assistance.

On the whole, much might be effected by training medical students in the public health of infantile disease, if one may so put it, and by employing young trained medical men much more freely in connection with hospitals, especially with the out-patient departments of children's hospitals, to visit the homes of the very poor. Parents would be encouraged to seek advice, not only in case of disease, but also as regards perplexities of management. Needless to say, the selection of such medical men would need to be very carefully made, and their training in the matter of children's diseases, and especially in preventive work, would require to be very thorough.

As regards district nurses, their training enables them to give useful help to poor mothers. Here again public health preventive work might be more fully taught.

Crêches have not taken root in our soil except here and there in an irregular manner. One would hope that this may be, to no small extent, because mothers in our large towns do so largely mind their children personally, that there is not room for crêches. There is, however, a great need for the crêche school. I recollect that this was strongly urged by one lady before the Physical Deterioration Committee, and also by Dr. Ashby.

The crêche school would consist of a number of small rooms, in which infants would be taken charge of for some time, and a central hall in which demonstrations could be given. This establishment would be placed in the centre of the poorest districts, and would be maintained at the public expense. It would be utilised for the training of teachers and lady health visitors in the care of infants, and, also, under very strict safeguards, against infectious disease, for the teaching of young mothers and nurses. It might also be utilised by bringing home to poor people how much could be done with infants by proper care.

The crêche would be a subordinate element, and teaching would be the *raison d'etre* of the institution.

If teachers generally are to give a course of instruction in the management of infants and young children, such institutions will, *in my opinion*, be indispensable.

We may next consider the instruction given by sanitary authorities.

So far as concerns the distribution of printed instructions, various criticisms have been passed. One is that in the great majority of cases leaflets will be tossed aside and not read. There is considerable force in this objection, but it should lead us rather to consider the form in which such instruction may be given than to discard it altogether. It should, certainly, be put together in some shape convenient to keep and to refer to. This may be either a handbill on pasteboard or metal, or a small booklet printed in large letters, which can be hung up somewhere, conveniently for reference.

Another objection is that the information usually conveyed is too cut-and-dried and that the mother is rendered afraid to vary the diet, which may, in fact, be usefully varied to suit different children. This is, perhaps, not the disadvantage which it seems, if it leads the mother to consult a medical man as to the best way to feed her infant.

If such instructions are skilfully compiled and suitably set forth, they do in fact influence a very large number of mothers.

The work of health visitors in connection with the care of infants is another matter. If properly carried out by intelligent trained ladies, it is calculated to be of the very highest value; but the qualifications are important. The health visitors should be highly trained and well paid, and the utmost care should be exercised in their selection.

If the work which we are asking the schools to do is well done, it would be worse than useless to send to the homes of the people workers whose knowledge would not enable them to speak with confidence and authority to their pupils.

This work is done in Manchester by the visitors of the Ladies' Health Society, who have the advantage of being drilled in the technique of infant feeding by an educated lady who has qualified as a sanitary inspector—Miss Eleanor Greg.

The value of good books is also intimately bound up with the projected training at elementary schools. An intelligent girl who is well-grounded in principles would be able to read a good book, and make the proper use of it.

All these educational influences, however, will necessarily be of minor value compared with the effect of a good practical training of the older girls at school, especially if this be supplemented by instruction in continuation classes. Such training will be general and will penetrate everywhere, while the aids which we have already considered exist only in favoured places. Even where these are at hand, the girl already educated at school will appreciate them, and will know how to profit by them.

How, then, is such instruction to be given in elementary schools?

We cannot well regard instruction in the management of infants and young children as a thing apart from housewifery and hygiene generally, or from cooking. Generally speaking, many of us hold that the time of girls in elementary schools, after they have learned to read, write, and do such arithmetic as they are likely to require, should be entirely given to such subjects.

This would imply that the Board of Education has come to see things from the same point of view, and that the subjects named are made compulsory, while other subjects less necessary are regarded as subsidiary. There would still be ample scope for the development of exceptional ability in any special direction.

It would also entail that teachers were trained so as to be able to impart this kind of knowledge.

At present the teachers would not, with perhaps rare exceptions, be capable of imparting such knowledge, which, be it observed, would be as useful to themselves as to their pupils.

If this most necessary knowledge is to be imparted, ample time must be given to it; not a fraction of the girl's attention, but earnest and devoted work.

At one time I considered Miss Ravenhill's syllabus for the training of teachers in hygiene as too comprehensive. Lately, however, I have had the opportunity of seeing how Dr. Ritchie contrives to get through a no less extended course by the aid of slides, and I am satisfied that teachers may have a sufficient knowledge of elementary physiology and hygiene imparted to them, to prepare them for the still more arduous work of practical instruction.

In an opening address to the Manchester Froebel and Child Study Association in 1903, I advocated that teachers should be trained by skilled medical experts, by practical demonstration on classes in school, to detect disease and privation. Admitting that Dr. Ritchie's course is excellent, I am still of opinion that the practical training advocated should be given. There are, no doubt, difficulties in the way, but they should not be insuperable.

Be that as it may, the training of teachers, preferably by expert medical instructors, is a necessary preliminary to the general instruction by them of schoolgirls in hygiene, *à fortiori* in the care of infants.

In the absence of such a body of teachers trained in the subjects which we consider so vital, can nothing be done, pending the training of younger teachers?

The Manchester Education Authority answered this question, in 1902, by the appointment of a lady—Miss Grace Taylor—who had been trained as a nurse, to give a course of instruction in the care of the infant to the older girls in schools.

Here is her syllabus of instruction. It might be regarded as incomplete, but, when it is explained that Miss Taylor gives her course to all the older girls attending the elementary schools, and that each course comprises six lectures with demonstrations, it will be understood that as much is done as is either useful or possible, especially if it be considered that this is no show performance, but carefully weighed practical instruction, tested by examination.

MANCHESTER EDUCATION COMMITTEE.

Syllabus of Six Lessons on Feeding and Tending of Infants and Young Children.

Teacher: Miss G. Taylor.

LESSON I.

Washing and Dressing a Baby.

1. Preparations for the bath.

2. Process of washing and drying. Care of eyes, ears, mouth, folds of skin, nose. Nasal breathing.

3. Clothes:—Description of first clothes for a baby. (N.B.—Patterns of these cut out by each girl in paper and taken home. One set of baby's clothes made up in material at each school.) Shortening:—Clothes for little children. Material for clothes. Boots and shoes.

Lesson II.

Washing and Dressing (*continued*).

Reasons for cleanliness. Action of skin. Dangers of dirt. Germs. Infection. Care of clothes. Care of hair, teeth, nails.

Lesson III.

Feeding of Infants.

Natural and artificial. Cow's milk. Dangers of contamination, and how to avoid them. Keeping of milk. Feeding bottles. Rules for artificial feeding.

Lesson IV.

Feeding (*continued*).

Diet from birth up to two years and upwards. Patent foods. Foods to be avoided. Indigestion; its causes. Dangers of anodynes and narcotics.

Lesson V.

General Management.

Sleep. Danger of overlying. The cot. Lifting and carrying a baby. Care of the back. Exercise. Learning to walk. Fresh air. Sunshine. Warmth.

Lesson VI.

General Management (*continued*).

Signs of health. Growth. Development. Signs of disease. Deformities. Rickets. Indications for consulting a medical man. Dangers of amateur doctoring.

C. H. Wyatt,
Director of Elementary Education.

Offices: Deansgate.

I have only one fault to find with this educational work—that there is not enough of it.

Such instruction should be often repeated, line upon line, and precept upon precept, with well chosen and striking illustrations, until the pupil has received an indelible impression.

If such a course were extended, and a large district like Manchester were broken up into a number of divisions, a teacher of high qualifications for this work being assigned to each, would not this meet the requirements better than to have the whole school work devoted to such subjects? Great part of the pupil's time might be given to this course and other work might go on independently.

The objection to this procedure would be that other subjects would tend to remain as at present, and that sufficient time would not be given to the course in domestic hygiene and economy, in which would be included the instruction on the management of the infant and young child.

The whole course should last a year at least, and be the chief subject during that time. On the other side is the serious difficulty in getting teachers of the necessary training and experience. It is doubtful whether anyone who has not had experience in the management of infants in hospital could profitably give such a series of demonstrations and lectures as those given by Miss Taylor.

For this subject, hospital or other equivalent practical training will be required.

On the whole, I incline to the view that an education authority could not begin better in this matter than the Manchester authority has done, and that in regard to that part of the teaching which relates to the infant and to young children special teachers should be employed, educated ladies, who have had, as nurses or otherwise, sufficient experience in the management of children, and in their illnesses.

The Manchester course should be extended by diminishing the areas covered by one teacher, and adding steadily to the number of teachers, the course having much more time and continuous attention given to it.

Teachers in other branches of work desirous of taking up this subject should receive special training at a children's hospital or crêche school.

I have drawn up a statement of what, I think, should be taught in the extension of the syllabus of the Manchester Education Authority which I suggest. Part of this extended syllabus is applicable only to continuation classes.

SYLLABUS.

Lesson 1.—*Physiology.*

Rapid growth of the infant. Hard work done by the lungs and by the digestive organs. Structure of the skeleton and muscles, illustrated by actual examination and movement. The movements in breathing. Essential object of breathing to supply oxygen to the blood and carry off carbonic acid. Effected by exposure of capillaries to the air, but separated from it by a very fine covering. (Gills of a fish shown. Lungs of a frog. Lungs of a sheep shown and explained.)

Circulation illustrated by a sheep's pluck.

For aeration of the blood the essential thing is that the blood should be pumped through the capillaries. The fine lining membrane easily injured.

Digestion. Illustrated by a rabbit's digestive organs. But also by demonstrating the mouth, position of the salivary glands, tongue, teeth, tonsils, and pharynx in a child.

Importance of mastication as soon as the back teeth are available, *i.e.*, after the age of 18 to 20 months or so. *Biscuits*, *Crusts*, not to be given before.

Processes of digestion.

The digested liquids carried to the tissues to nourish them, and to give heat and movement by a process of combustion.

They must, therefore, contain the materials necessary to build up all the different structures of the body.

The function of the skin. The need for conserving heat in winter (saves the digestive organs). The effects of chill. (Saving the lungs.)

Lesson 2.—Dirt.

Visible dirt.

Invisible dirt. Micro-organisms. Living plants, some of which growing in the body produce matters hurtful to health and dangerous to life.

Demonstration of invisible dirt. Exposure of nutrient gelatine in a Petri dish, and growth at a suitable temperature for a couple of days, with the usual precautions. Blank experiment. Same with a little dust off a wall, or from the finger.

Demonstration of the effects of a speck of dirt in melting nutrient solid gelatine.

Production of poisons.

How dirt acts on the mouth, tonsils, bowels and lungs.

How dirt is carried to food, such as milk.

(*a*) From without by the air.
(*b*) From without by flies.
(*c*) Carried into the house by feet.

Dirt may come from the infant's clothes, from its fingers, from the mother's fingers, from the comforter, or be carried direct by flies.

It may get into its mouth or nose in breathing, and so reach its lungs. Draughts. The floor. Dirty sofa.

Need to exclude dirt, and how this may be done. Needful precautions are:—

(*a*) To cover all food intended for the infant from access of dirt or flies, including milk, bread, sugar, condensed milk, biscuits, etc.

(*b*) Never to handle food with dirty hands.

(*c*) To boil all milk intended for the use of the infant during the next twenty-four hours as soon as it arrives, for at least twenty minutes, and then keep it in a clean jug covered with a clean cloth, cooling it rapidly.

(*d*) Never to touch the infant's mouth with the fingers unless these have been recently thoroughly washed, and the nails cleaned. Never to allow dirty matters, such as comforters, dirty garments, or flies, to get to the infant's mouth.

(*e*) To avoid rag mats, and all floor coverings in which dirt can lodge. For the same reason furniture should be covered with some cheap material which will not absorb dirt, such as American leather, canvas, etc.

(*f*) To keep all surfaces thoroughly clean. The floors of the living room, if the baby is kept there, should be washed as often as necessary, and at once thoroughly dried. The furniture should also be kept clean, being washed if possible, otherwise wiped with a moist cloth. The walls should be cleaned with dough, or, at all events, the lower three feet, every two or three months.

(*g*) The child's clothes and hands must be kept clean.

(*h*) It should not be placed on the floor. If this cannot be avoided, a portion of the room must be selected where there is no draught, and this portion must be kept specially clean.

It will generally be impossible to find such a spot when there is a fire burning, and in such a case the baby must be placed in a cot, or on a sofa provided with a non-absorbent covering, or suspended from the ceiling in a hammock.

(*i*) Draughts bring two dangers. They tend to chill the skin, and so injure the lungs. They also carry dirt to the lungs. The former danger may be disregarded in warm weather. The latter is then greatest, and depends on the dirt outside, and on the dirt collected on the floor.

To remove dirt outside, whether arising from middens, pail closets, or refuse of any kind, may be beyond the power of parents, but should be always in their minds.

It is essential to understand the following requirements:—

The ground outside the house should be clean.

Any closet near the house should be a water closet.

The drains should be in good order.

Domestic refuse should be kept in covered receptacles.

There should be no collection of uncovered horse manure or other refuse near, in which flies can breed.

Lesson 3.

Washing and dressing the infant.

Demonstration of both on the dummy, or, if possible, on an infant.

There should be at least one daily bath.

Temperature of the room during the bath must be about 65 degrees F. Room thermometers.

Temperature of the water about 100 degrees F., comfortable to the elbow.

Value of the bath for free movement of infant's limbs.

The clothing must be warm, and must cover the whole body, except in warm weather.

The garments used should be as few as possible. They must not fit tight enough to impede respiration.

The material to be used in napkins.

Demonstration of outfit.

To keep the skin warm is to save the digestive organs a considerable amount of work, in producing material for the supply of heat otherwise unnecessarily lost.

Dirty clothes injure the skin. Wet garments also lose the power of keeping in warmth. In both ways the lungs and bowels are injured. Injury to the skin also arises when a soap is used which contains too much alkali (mild soap).

The infant should never be left in wet clothes, and care should be taken to keep the skin whole.

If the mother can possibly afford it, she should dress her child in woollen garments, especially after he begins to crawl about. The fire should be protected by a fire screen, which may be got for a shilling.

Flannelette is altogether too dangerous a material, unless the danger of fire is thoroughly grasped and precautions taken.

Precautions needed, if flannelette is used.

Lesson 4.—*The Lungs.*

Dangers of an atmosphere containing dirt.

If the child breathes by the nose the air is sifted of its impure contents which collect in the cavity of the nose. If by the mouth, it collects on the mucous membrane, tonsils, and upper air passages. But more reaches the lungs than if the nasal passages are used. If the mucous membrane is weakened the living matter in it grows on the injured spot, and is drawn into the lungs. Part passes direct into the lungs. These accumulations must be considerable, and may start diseases directly from the nose and tonsils, or lower down in the lungs.

It is true the air passages have special constantly moving little brushes which sweep back dirt attempting to penetrate into the finer parts.

Nevertheless dirt does frequently penetrate, and that in proportion to the amount of dirt breathed.

It is, therefore, very important that the infant should breathe clean air.

It is also very important that it should breathe deeply, so that the blood may get plenty of oxygen gas.

Breathing is stimulated when the infant is taken into the outer air, which should be done regularly, except when there is a great amount of dust blowing about, or when it is raining heavily, or when there is a fog, or when there is a bitter east wind blowing.

Many poor people cannot afford a perambulator, and are obliged to air their infants in their arms. This is heavy work. They are tempted to take them to some friend's house, where perhaps there is some-one ill of infectious disease.

When infants are taken out for an airing they should be taken to some public place, green and sheltered, furnished with chairs, where the tired mother can sit down and rest, or to some open space similarly furnished.

If the weather does not allow the baby to be exercised outside, this should be done inside, the windows being thrown wide open, except when there is fog.

In case of a fog, the room in which the infant is must have a fire, the doors and windows being closed.

On no account must a poorly-clad infant or young child be taken out in cold weather. The circulation of the skin is, under such circumstances, liable to be stopped, and disease of the lungs may set in.

The infant may suffer severely, however, by being kept at home.

No effort should be spared, therefore, to find the infant and young child in clean and warm clothing.

Lesson 5.—*Feeding.*

General principles.

Necessity for regularity.

Regulation of quantity and rate of feeding.

Times of feeding. Why more frequent at the outset.

Weaning, to be done gradually.

Subsequent course of feeding.

Sickness. Wasting. Action of the bowels.

Dangers of the warm season.

Diet up to the end of eighteen to twenty months.

After this the teeth to be exercised.

Foods to be avoided by the mother while suckling.

The teeth, their individual uses. Order of development. Change in child's feeding at eighteen to twenty months.

The enamel shell. How broken through. Thinness due to want of vigour of child and lack of exercise. How a young child's teeth should be exercised.

Valuable results of exercise of the teeth.

Demonstration of the various teeth.

Where dirt accumulates, and how it is to be regularly removed.

Great importance of attending to the teeth.

Training of habits necessary for good digestion.

(*a*) Abstention from unnecessary nursing.

(*b*) Cots.

(*c*) Training to sleep regularly. Amounts of sleep required at different ages.

(*d*) Regular action of the bowels. Soap suppositories. Injections of warm water. Liquorice powder or fluid magnesia.

Natural feeding.

The infant generally thrives best on mother's milk.

Every animal gives milk which suits its own young ones. Composition of human milk, and why it is so valuable as a food. Contains in suitable proportions all that is necessary for growth of all the tissues, and is easily digested.

Rennet. Demonstration of its action. Difference of the curd of human milk and cows' milk.

Other reasons why mother's milk is better for the infant. Its freedom from injurious living material; from the products of decomposition.

The sacredness of motherhood.

Preparations which the mother should make to nourish her child. Regular habits. Regular exercise. Avoidance of undue exertion. Abundance of plain, nourishing food. Kind of food. Avoidance of alcohol.

The reasons why mothers fail to give the breast. These are in part removable or avoidable. Bad advice. Retracted nipple. Cracked nipple. Abscess.

Care of the breast.

Articles of food to be avoided by the mother while suckling. Alcohol.

Regularity in feeding. Times. Danger of over-feeding. Slow feeding. Signs that the child is not receiving enough nourishment. Signs that it is receiving too much.

Necessity for cleanliness in person and dress of mother.

Infant's mouth not to be interfered with, except to cleanse it after feeding. How this may be done. Danger of comforters. Danger of rubbing the gums.

Child to be protected from flies settling on its lips and nose.

Weaning, how to be managed, and the reasons.

Infant not to be weaned under the age of eight months, except under medical advice.

Lesson 6.—*Feeding* (*continued*).

Artificial feeding.

May be a necessity.

A child should be weaned at nine months, but if the weaning falls in the diarrhœa season and the mother can give the breast, she should continue to do so till the dangerous time has passed over.

A child may have to be weaned from the outset.

If so, the diet will have to be very carefully regulated.

The only available substitute for mother's milk in towns is cows' milk.

This is procurable in three forms, as so-called fresh cows' milk, condensed milk and dried milk.

Constitution of milks repeated.

Defects of condensed milk and dried milk for prolonged feeding. Danger of purchasing the wrong condensed milk. Reading of tins.

Fresh cows' milk the best.

Defects of cows' milk when perfectly fresh. Defects as sold. Requires to be modified, to make it more like human milk in the curd.

The modifications are different as age advances, on account of the need for increased nourishment.

Size of the infant's stomach at birth. As it grows more food can be taken.

Cows' milk requires to be thoroughly boiled to kill the germs usually present in considerable quantities.

Mode of boiling.

As the milk has to be rendered very dilute at first, to make it digestible, and as the stomach can hold very little, the infant has to be fed oftener.

As the milk diet becomes stronger, the intervals between feeds are increased.

The mother who modifies the infant's food for herself has thus to be trained to learn a good many things, and to learn them well.

She must know how to modify the infant's food at different ages. She must learn the quantities to be given at different ages. Finally, she must render the milk free from germs, and it must be given in absolutely clean utensils.

Modification of milk.

This is most simply done by adding water, and boiling the mixture, of which there should be a sufficient quantity for 24 hours, or at least 12 hours. This method makes the curd easier of digestion, but leaves the mixture too poor in cream.

This may be remedied by standing the milk in cold water for a few hours before use. The lower part of the milk can then be syphoned off, and the top part treated as if it were fresh milk. Or, if syphoning is considered too difficult, milk may be stood, the top part being taken off and mixed with water as if it were whole milk.

Table to be used in infant feeding, showing the degree of dilution at different ages, whether of fresh cows' milk, or of top milk, the ingredients added, and the intervals of feeding.

The child is then to be drilled according to the table, and with the following technique, which is explained.

Drill in Infant Feeding.

The following articles are required:—Two or three earthenware basins. Three or four jugs. A boiling pan, preferably double-jacketted. Kettle. A number of cheap cloths to cover dishes. A feeding bottle graduated in tablespoons; two short teats. A little bicarbonate of soda. Fine white sugar or milk sugar in ounce packets. Washing soda.

All utensils must be kept scrupulously clean, and the milk jug should be kept covered. The feeding bottle and teats are to be kept in an earthenware basin containing water which has been boiled, and which is kept covered with a clean cloth.

When the milk is purchased, if it is to be stood for cream, the jug must be covered over with a clean cloth and placed in a basin containing cold water. The cloth may usefully dip into the water. For this purpose it should stand four to six hours.

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TABLE OF DIETS FOR CHILDREN UP TO SIXTEEN TO TWENTY MONTHS OF AGE.

Age.	Materials and Quantities for Twenty-four Hours.	Amount at Each Feed.	Number of Feeds and Times of Feeding.	Summary of Precautions Needful in Feeding.
First two days . .	Six tablespoonfuls cows' milk, two tablespoonfuls water, one teaspoonful white sugar or milk sugar. Or sugar water may be used instead, 1 oz. of milk sugar to a pint of water.	Three tablespoonfuls.	Nine feeds, at 2.0 a.m., 6.0, 8.0, 10.0, noon, 2 p.m., 4.0, 6.0, 10.0.	As soon as the milk has been purchased make up the mixture in column 2, boil for twenty minutes, pour into clean jug, cover with clean cloth, place jug in basin of cold water to cool milk, with ice when procurable in basin. Pour quantity required at each feed into feeding bottle, at once replace jug in basin and cloth on jug, renewing the cold water as required.
Up to six weeks .	Twelve tablespoonfuls, twenty-four tablespoonfuls of water, sugar as above, 1 oz.	Four tablespoonfuls.	Nine feeds, as above.	Precautions as above.
Up to three months.	Twenty-four tablespoonfuls milk, same quantity water, milk sugar 1 oz.	Eight tablespoonfuls.	Seven feeds, 2.0 a.m., 8.30, 11.0, 1.30 p.m., 4.0, 6.30, 9.0.	Precautions as above.
Up to six months . .	One gill and twelve tablespoonfuls of milk, sixteen tablespoonfuls water, milk sugar 1 oz.	Eight tablespoonfuls.	Six feeds, 9 a.m., noon, 3.0 p.m., 6.0, 9.0, 3.0 a.m.	As above.
Six to seven months .	Cows' milk, one pint.	Eight tablespoonfuls.	Five feeds, 6.0 a.m., 9.30, 1 p.m., 4.30, 8.0.	As above.
Seven to nine months .	Same, with increased quantity.			
Nine to twelve months .	6.0 a.m., twelve tablespoonfuls of cows' milk boiled; 9.30 a.m., same boiled with fine oatmeal; 1.0 p.m., as at 6 o a.m.; 4.30 p.m., same boiled with bread crumbs; 8.0 p.m., same as at 6.0 a.m.			
Up to eighteen months .	7.0 a.m., bread and milk, or oatmeal or hominy porridge, with plenty of milk; 11.0 a.m., twelve tablespoonfuls of milk; 1.30 p.m., bread crumbs and gravy, or a slackly boiled egg, with bread and butter soaked in the egg; 5.30 p m., bread and milk; 9.0 p.m., milk to drink.			
Up to three years . .	As the infant is able to masticate food, the diet may be gradually extended. But he should not have foods difficult to digest, such as pork or tough meat. Milk is to remain the principal article of diet.			

If it is not to be stood for cream it is at once mixed with water and sugar in the prescribed proportions, and the mixture boiled for twenty minutes. If it is stood for cream, the lower half is syphoned off, and the top half used as if it were whole cows' milk.

The boiled mixture is then poured into a clean jug, which is covered with a clean cloth and placed in the earthenware basin containing cold water, the cold water being renewed as occasion requires.

The further procedure is as follows:

Take the case of a child under six weeks of age. When about to feed the child the mother pours some hot water into a jug containing hot water, then she takes the feeding bottle out of the clean boiled water, and at once replaces the cloth over the bowl, then she takes the clean cloth off the jug containing the twenty-four hours' food, pours four tablespoonfuls into the feeding bottle, as shown by the mark on the bottle, at once puts the cloth back over the jug, and places the jug in the basin. She then takes the teat out of the bowl, and replaces the cloth. She next draws the teat on to the feeding bottle, and puts the feeding bottle into the jug containing hot water. When this has been comfortably warmed, as shown by feeling the bottle with the back of the hand, she feeds her baby, and then puts him down. Immediately after feeding him, she washes the bottle with clean water and washing soda, and then rinses out with clean running water. She then replaces the bottle in the bowl. Then she washes the teat, and having put that back in the bowl, replaces the cloth over it. She is then ready for the next feed.

No step in the above process may be safely omitted. The clean boiled water in which the bottle and teat are kept is to be renewed daily.

At other ages, except that the intervals and quantities are different, she proceeds exactly in the same manner.

This drill is necessary whether the milk is to be modified at home or at a municipal depot.

Only in this way can mothers in general come to learn how great are the precautions needed, and how much they are saved by the modified milk sold at the Municipal Depot.

It is needful, however, that the milk shall be fresh cows' milk, whether it is modified at home or elsewhere.

That milk coming from a distance may be fresh, it must be from clean cans, milked in a clean stable, cooled down directly after milking, kept cool on its way to the station, rapidly conveyed to town in tightly closed vans containing ice, placed in an ice store till ready for distribution, kept cool at the milk shop, and modified directly after purchase.

So successfully has cooling been attained by Mr. Busck of Copenhagen, that infants' milk is sold by him which may be taken uncooked with very little, if any, risk by infants, at least if kept in ice at home.

Fresh milk may be procurable from some farmer in the neighbourhood, but all cannot be supplied in this manner.

The housewife cannot herself apply any test of safety to the milk. Still she could see that it smells and tastes sweet, gives a good supply of cream on standing, and is free from dirty sediment. But all this does not ensure safety.

Lesson 7.—Feeding (continued).

An infant must not have a bit of what the parents are taking, until the age of two years or thereabouts is reached. Care must then be exercised to see that any food given is thoroughly masticated.

An infant under eight months of age is to have no food containing any material amount of starch, and the introduction of such food, which includes bread, flour, arrowroot, oatmeal, biscuits, etc., should be gradual. Reasons.

Milk is to constitute the principal article of diet of a child up to three years of age. Reasons.

From weaning up to the age of eighteen to twenty months, when the first molars have appeared, the diet is to be such as not to require mastication.

Diet at this age (Ashby).

After this age the teeth should be regularly exercised on hard biscuits or rusks.

The diet may now be extended, but must be such as not to cause indigestion.

Articles to be avoided.

Diets from eighteen months to three years (Ashby).

Adaptation to poor people.

Lesson 8.

Every mother should be able to take and record temperatures. This will be of the greatest assistance to many in telling them whether a doctor is needed. It will often be of use to the medical man.

What a thermometer tells.

Only a medical man can say what is implied by high temperature.

How to take temperatures in the groin, or armpit.

The pupil is to be trained in reading the thermometer after it has been dipped in water of different temperatures.

The time required by different thermometers to give the body temperature.

Shaking down and cleaning the thermometer.

The weight of infants should be taken once a week, at all events in all cases where they do not seem to be thriving.

A weighing apparatus should be readily accessible at a chemist's, doctor's, or under the auspices of the Education Authority.

Demonstration to be given of how to weigh babies, or dummies, wrapped up, and girls to do this themselves.

The liability of serious illness in the baby to escape attention till it is too late. Constant watchfulness without undue anxiety.

The great value of free movements to the baby.

In the bath.

In a warm room, or in warm weather, unencumbered by clothes.

Helps to develop the muscles and bones, and indirectly aids digestion.

Need to see that the infant when uncovered is warm.

Lesson 9.—Disease.

Causes of disease.

Want of vigour or disease at birth.—If the doctor or midwife says that the baby is not healthy, it should be kept under medical advice till out of danger, and any instructions given by the medical man must be carefully carried out.

Failure of the mother to suckle the child.—The artificial food given to the infant is almost certain to disagree, even if all directions are carried out ; but an effort should be made to obtain milk from a reliable farm, as soon as possible after the cows have been milked.

The directions for the preparation of such milk given by the doctor, and the precautions to be carried out in keeping it, must be carefully followed. The greatest care, also, should be used in cleaning utensils.

Milk which has come from a dirty farm, or has been kept a long time, is likely to be hurtful to the infant, even if it has been boiled. The greatest care must be used in choosing milk.

The digestion may be injured by giving the child too much food, or milk which has not been sufficiently diluted.

In either case the excess of food ferments in the stomach and bowels, and injurious products are formed which cause the intestines to be inflamed and poison the child's system.

Injury is inflicted by giving food at irregular times.

The stomach and bowels, which are very hard worked, have no time to rest, and fail to do their work. The result is that the food ferments and causes indigestion. Besides, the infant wants to sleep most of the time, and it does not get rest.

Any interference with the child's mouth except to clean it in a specified manner, teething powders, soothing medicines given by the mother herself without advice, are almost certain to cause indigestion.

Want of fresh air and sunshine lowers the vigour of the child and makes him less able to digest his food. He is thus rendered much more susceptible to the influence of any error in diet.

Any dirty matter in the food such as is certain to get in if the food is kept in a dusty room, exposed to dust and flies, is likely to cause indigestion.

Many children are very liable to have their digestions deranged even by slighter causes than those which have been named, and it requires great judgment on the part of the mother to get them right again.

This rule may be laid down, however, that when the child has once become affected with indigestion, the food must for a time be rendered easier of digestion.

It may be necessary to substitute barley water for milk, or to make the milk dilute. The same purpose may sometimes be obtained by digesting the food beforehand—Benger's, Fairchild's.

Signs of Disease.

Vomiting of hard sour-smelling curd after a meal. (Posseting not a sign of disease.) Signs of pain in the abdomen. Continued crying. Distended abdomen.

Diarrhœa.—Sickness. Green loose stools, too frequent. Flakes of mucus. Excoriated anus. Wasting. Convulsions. Need for advice and careful treatment urgent.

Wasting.—Indigestion. Shrinking skin or limbs and trunk, constipation or diarrhœa. Loss of weight.

Convulsions.—Slighter. More severe. Result of poisoning from indigestion. Reflex irritations. Commencement of acute illness. Always serious.

Failure to gain weight.—Always serious.

Cough.—Throat cough from indigestion (no rise of temperature). From lung disease (temperature raised and respiration very frequent). From tubercular lung or from collapse of lung in wasting (increased respiratory frequency). In dirty atmospheres, as an effort to avert disease. If frequent, may be the beginning of measles or whooping cough.

Other signs of measles and whooping cough.

High temperature.—Every girl must learn how to take temperatures.

This lesson will be useful chiefly in impressing on the minds of girls the importance of not going on experimenting with infants suffering from wasting, indigestion, diarrhœa, etc., and of seeking the best medical advice they can get as soon as possible.

Lesson 10.—*General Care of the Infant.*

The mouth.—Thrush, ulcers, scurvy in the gums, cleaning of the mouth by way of prevention and treatment. Orange juice. Mouth breathing.

The eyes.—Inflammation in. Treatment of.

The ears.—Running from. Importance of.

The hair.—Treatment of.

The nails.—Care of. Very important.

Sweat rash and rickets.—Urticarial eruptions.

Excoriations.—Treatment of.

Regularity and formation of habit.—Illustrated.

The syllabus ultimately adopted may be very widely different from that given above, but at all events the two which I have furnished will serve as a basis for discussion. There are, I am aware, several disputable points contained in the longer one; for example, the elementary bacteriological demonstration of dirt, and of its effects, and the training of the child to take temperatures and record them. Yet those things should not, I think, be left out.

We will suppose a satisfactory syllabus drawn up. The next thing will be to induce the Board of Education to accept it, and to give to it the necessary time. The Board have already agreed to accept a course of six months' training in housewifery, and it has been suggested to me by Mr. Wyatt that the extended teaching indicated might be included. I am not sure, however, that it has yet come to be understood how much time and training, what an amount of infiltration, is needed to render the desired education of real value.

Possibly the new course of the London Education Authority is designed to include the care of infants.

There is an old proverb that beggars must not be choosers, and, therefore, we will take all we can get in the meantime, knowing that time is on our side.

The syllabus which I have drawn up is designed so that the schoolgirl may see things with her own eyes, and do things with her own hands, as far as possible. If she cannot get to study the real infant, at least everything possible should be either real or realistic. The teacher's training, however, should include study of the infant, and her experience should be as large as possible. No theoretical education will enable a teacher to select the essential things to be imparted, or to impart them when selected.

If all this means restriction of the amount to be taught, then let it be restricted. One would hope, however, that this kind of teaching will not be restricted but extended, and that young women will, more and more, go to evening classes with a view to keep up and enlarge their knowledge.

There are parts of the subject which may not be fitly taught fully to school girls—such as the obligations of mothers to their unborn children, the management of the period of pregnancy—which young women may learn with great advantage. We must not be disappointed if the subjects which may be included in the term housewifery are not all at once recognised as possessing a paramount claim both from the educational and from the utilitarian standpoint. The machinery of education is complicated, and much skill and patience are required in taking out old parts and putting in new.

It is no small matter that great centres like London and Manchester are practically recognising these subjects, nor must I omit a tribute to the splendid pioneer work of Miss Ravenhill, both as teacher in the West Riding and as organiser.

In the suggestion to teachers issued by the Board of Education there are signs that the high educational value and the great practical need of domestic training of girls are not overlooked.

It will be for all those, and they are many, who hold the views which I have expressed, to maintain a steady but judicious pressure.

Another suggestion one would make.

I have enumerated various bodies who are all engaged in the instruction of mothers. It would be a great gain if the instruction given were co-ordinated so that one authority should supplement the teaching of the others. It is essential that the mother should not be confused by conflicting instructions.

If, in large centres, recognised representatives of the Children's Hospital, of the Educational Authority, of the Public Health Department, and of the Midwives Supervising Committee were to be constituted into an Advisory Committee to discuss and co-ordinate any instructions already issued, and generally to bring into line public instruction from the different points of view, I cannot but think that decided advantage would accrue to the community.

Miss Alice Ravenhill: I wish to bring before you the various arguments against the introduction of a detailed course upon the rearing of infants in the ordinary elementary schools, and I will base my arguments upon three practical points. I speak in the threefold capacity of student of (*a*) normal development in childhood; (*b*) education; and (*c*) hygiene; and while I am prepared to find my views unpopular, they are based upon information collected from many countries as well as from personal experience. My points briefly are:—

Direct teaching upon the rearing of infants is out of place in elementary schools, *i.e.*, before the age of fourteen or fifteen; it is questionable if much result would follow its introduction into secondary schools even for girls of fifteen and upward.

Indirect teaching upon the subject given by well prepared and interested teachers is of great service. This includes the formation of habits of cleanliness and care of the person and surroundings; an introduction, by means of nature study, to the general requirements of life and of the special care needed by immature life, both animal and vegetable; and observations upon the laws of cause and effect, made during certain practical work in general elementary science, and even in the study of history and literature.

The reasons in support of this opinion are based upon the following facts:—

1. *Developmental.*—Childhood is a period of development, of which certain phases are distinguished by more or less well defined characteristics. The postponement of maturity in the animal world is associated with the degree of development attained. It reaches its maximum height in mankind, as pointed out by John Fiske, whose views are supported by G. Stanley Hall and other writers, notably Karl Groos, who emphasises the value of the play period in childhood. If artificially curtailed, as by premature assumption of responsibility or enforced adoption of adult duties, both the individual and the community are the poorer. A characteristic of very early childhood is a marked interest in, and desire to carry out, the work of grown-up people, but after the age of ten or eleven this is succeeded for several years by a period when self, not society, is the paramount interest. The maternal instinct which prompts girls to play with dolls fades, and they become largely self-absorbed. Interest in the care of infants will return later on, but if precociously stimulated into activity it is feeble or short-lived, induces *ennui*, and leads to little practical result. To shorten the normal period of childhood by telescoping some of its phases in the effort to equip prematurely for the duties of

maternity is against the principles of the biological and sociological teaching of the day.

2. *Educational.*—It is the opinion of the best educationalists in all countries that no effort at specialisation or definite technical training in any subject is allowable before fifteen or sixteen for either boys or girls. The preceding years must be devoted to acquiring a basis of general knowledge which will assist the child to adapt himself to his environment; without this foundation any superstructural efforts will prove disappointing. The child mind is not adapted to the study of detail, neither should strict accuracy of performance be demanded in the first school years. Whereas instruction upon the rearing of infants necessitates great attention to detail, great accuracy in respect of time, cleanliness and care, and presupposes some elementary knowledge of the conditions essential to healthy life; it may be truthfully described as a technical study. That children have to nurse babies, or to leave school early, are no real arguments against this statement. Authorities must enlist the assistance of well-trained teachers, and through them arouse in children a genuine interest in life in its simpler forms, and devise means for quickening a desire in girls to attend suitable courses on the care of infants and little children *after* they leave school, and are of an age to profit by the instruction given. The elements of practical cooking and right methods of domestic cleanliness should precede this teaching, and can well be given in the last year of school life.

It is equally important to arouse interest in the value to the community of infant life among girls who have had a secondary school education and among elder boys. This may be done from the biological, the economic, or the civic, as well as from the hygienic side, but time forbids any detailed suggestions.

3. *Practical.*—Where the teaching is given too early an impossible task is laid on the children. They must either attempt to break through stereotyped traditions in homes where every difficulty exists to defeat hygienic practice, and lay themselves open to the reproach of contempt for parental methods, or they are expected to memorise these lessons so accurately that they can reproduce them when they marry, six, eight, or more years later.

In Belgium, where the most complete organisation exists for training girls in domestic science, there is evidence from the large and increasing provision of classes on infant management for young women, that to give such teaching too early has proved unprofitable. In Sweden, and probably elsewhere, crêches are utilised as training schools where young women can attend short practical courses either for consecutive days or weeks, or at intervals of a week, a foundation in elementary hygiene only being attempted during school life.

Miss Taylor (Manchester) gave an explanation of the system of teaching in the Lancashire schools. It consisted of a very elementary course of lessons on the care of infants, six lessons of fifteen minutes each, and was given to the elder girls in the elementary schools. As much demonstration as possible was given, and a large doll, the size of a small baby, was used for the demonstration in the lessons of washing and dressing. The actual process of washing was gone through, and the reasons given for everything done. The clothes were shown and the material they were made of explained. Patterns of suitable clothes were cut out in paper and taken home by each girl, and one complete set was made in each school. Three simple lessons in feeding were also given, Dr. Niven's dietary being followed. The method of boiling and keeping milk was explained, and the attention which should be given to cleanliness in every detail enforced. Simple rules based on common-sense observation as to whether a child was thriving or not were given, and the evidence of the need of seeking medical advice pointed out. It might be said that the girls, who were from twelve to fourteen years of age, were too young to have such things taught to them. But it was to be remembered that in Lancashire the girls began to work as soon as they left school, and there was no further opportunity for them to learn anything which would concern their after-life as mothers. It was a pity to teach them so young, and she quite agreed with Miss Ravenhill on that point, but until there were compulsory evening and continuation schools in which these children could learn these things later, the present arrangement was a stop-gap and the best that could be done under the circumstances.

Alderman B. Turner (Batley) desired to express dissent from some of the points raised in the paper read by Dr. Niven, who said that it was possible to put back the hand of time, and to say that prior to wedlock a woman must be engaged in domestic work. He, on the contrary, thought it was possible to put forward the hand of wisdom, and to a large degree to stop women's labour that interferes with domestic life and the growth of our infant population. The bedrock of infant mortality was not, as Mr. John Burns had been trying to show, altogether drink, but poverty was one of the biggest factors. Therefore, if besides teaching those lessons which were advocated in the paper they were to teach them how to abolish poverty by a course of instruction in the schools, they would be improving generally the condition of the children at large. Poor housing had a great deal to do with this question of infantile mortality, and poor housing was a wages problem. People could not afford to pay the rent of a decent house, and he thought that attention should also be directed to that matter. Mr. Burns had been trying to prove that the infantile death rate was as much caused by drink as other things, but there were scores of families in which the parents and grandparents did not drink, but in which the children died at a speedy rate. With regard to crêches, the desire was that the mothers should be motherly in the real and best sense, and he favoured motherly-matron visits to the homes rather than that such visits should be paid by women trained at Newnham and Girton. He agreed with the Lancashire system of simple lessons, but thought that the course laid down in the paper was far too complex for girls of thirteen and fourteen years of age to understand. He thought, too, the papers were above the heads of the ordinary working classes, and urged that much more simple operations should be adopted.

Dr. R. Caton (Liverpool) thought the conference owed a debt of gratitude to Dr. Niven for the way in which he had discussed a question which was of such great importance to the welfare of the country, and for pointing out how exceedingly powerful a weapon we have in combating this evil by a system of education. Children were taught a great many departments of knowledge, but hitherto there had been neglect altogether in teaching them how to live; surely that was one of the most practical and important departments of the knowledge which it was their duty to impart to them. He felt very strongly the difficulty which had been mentioned in regard to the pre-natal condition of children. They must remember that one of the most important points to secure the stopping of infant mortality is to improve the health of the mother. If the mother were healthy and able to give the child its normal nourishment, there would be a very small amount of infant mortality. The teaching required for that could be given to every child with the greatest possible ease. It was a lamentable thing that our population, through the difficulties of town life, had unhappily lost those simple old instincts which used to keep the people fairly right in bygone days. Milk, oatmeal, and plain simple food used to keep our forefathers in normal and vigorous health, but these were now replaced by wretched artificial forms of food which were puffed and advertised to a vast extent. These, unfortunately, instead of nourishing and rendering vigorous and healthy the fathers and mothers of to-day, were injuring and sapping the health of the people very greatly. What they wanted to do was to teach every child as absolutely essential the plain rules of breathing clean air and drinking pure water. We wanted them to know how little is the value of alcohol and how little is the value of tea, and, indeed, how very dangerous tea may become and does become to town populations. These simple plain rules of living could be taught to fourth and fifth standard children, and could be perfectly well understood by them. He believed if this could be done we should be doing a great deal to raise the health of our population and to minimise the danger to and suffering and death of the infant population, whose condition was a serious factor in town life to-day.

Dr. Marsden (Birkenhead) desired to call attention to one point not mentioned in the papers. A great deal had been heard of the methods of feeding and the treatment of mothers, but not a word had been said as to the dragging of little children about at all hours of night by their parents at times when they ought to be having their proper rest. If there was one thing which was detrimental to child life it was this perpetual taking them about during hours when they should be at rest. This was a point of elementary hygiene which ought to be taught in the schools.

Dr. Ritchie (Manchester) explained the lectures given to pupil teachers on the subjects of hygiene and disease in the Manchester schools, and how a course, which was in point of fact rather complicated and advanced, was given to girls and boys and pupil teachers with comparative ease. In teaching the pupil teachers hygiene and disease they should remember they were preparing for the teaching of the younger children later on. The method he adopted was to make extensive use of lantern slides, and to show them physiological sections and specimens. He could show them rashes and all sorts of interesting things which would keep their attention fixed, and this proved that the system of tuition adopted by lantern slides was successful. Some results had been interesting : for instance, he had been called upon to go to different schools to verify a diagnosis which had been made by the pupil teachers, as a result of the instruction they had received. Chorea, for example, that was shown occasionally in the different handwriting of the pupils, and by showing that on the slide they could get the teachers to diagnose the disease for themselves in the schools. There was no compulsion in the attendance at evening continuation schools in Lancashire, and very often children left school before they actually were in the fifth standard. If, therefore, the children are not got at in school, they could not be taught these things at all. He agreed that Dr. Niven's course was probably advanced for the ordinary school child, but it was wonderful how much could be imparted, even of a delicate nature, by trained teachers. Something had been said as to tackling the present mother. Well, tackling the present mother in detail was a tremendous question. They could not hope to do much good with that question at present by tackling the mothers in the home ; they must get the children in the aggregate if any progress at all was to be made.

Miss Boileau (Wakefield), referring to the remarks of Miss Ravenhill and Alderman Turner, said that her experience amongst the people of South London and in the West Riding towns had made her feel that the instruction of an extended syllabus would be no real benefit to the children in the upper standards of elementary schools. They would receive instruction about their babies at a later time from other people ; and that instruction, whether for good or bad, would almost entirely blot out what they had learnt at school between the ages of thirteen and fourteen. Much of the suggested instruction was necessarily a counsel of perfection, and the ordinary child was extraordinarily loyal to its own home. A teacher might instruct a child as to the shape of the earth, or anything of that kind, and the child had nothing with which to correct the teacher; but directly a teacher began to talk about babies, then the child could bring to bear its every-day home experience of the actual taking care of the baby, and would immediately put its own experience in front of the teacher's, and that she had found to be the case in the average child. What was required was to be able to learn in a crêche or in a hospital ward how to take care of a baby in a two-roomed house that had no water laid on. She had had to tussle with cases of zymotic diarrhœa in a house twenty yards off the water tap; and could they wonder if a mother could not keep things clean, and take care of the milk, in a house where there was no place to keep it in except in a little cupboard under the stairs? It was enormously difficult to teach how these things should be done under the actual circumstances of the homes. She thought what was wanted was the teaching received from visits paid to the homes, and that teaching of a theoretical character given to children of thirteen or fourteen could not be any real help; besides, it was very bad for a child to be entrusted with the duty of washing a baby. What would be better would be to teach children to take care of babies in the street, and not to give them such things as sweets and apples and let them stand at draughty corners.

Dr. Scurfield (Medical Officer of Health for Sheffield) drew attention to the best form of continuation classes, and that was the class held by Messrs. Rowntree at York. The firm employed about 1,300 females, many of whom were to become future mothers. Those females were employed on the condition that they should work 54 hours per week at a certain wage, and attend two hours a week at a class for cookery and domestic economy. Mr. Seebohm Rowntree informed him that the Government grant paid the cost, and the only expense they had been put to was the installing of the kitchen.

Dr. Templeman (Dundee), referring to Dr. Ritchie's remark with regard to training teachers in hygiene so that they should be able to instruct the pupils under their charge by means of lantern slides, said that Dr. Leslie MacKenzie, of the Scotch Local Government Board, had got even a better system than that. It was a system which had been adopted in teaching the students the subject of school hygiene for some years, and that was to break up the classes at lectures with lantern slides into small sections, and where the students were training for teachers to take them to the schools and give them, as it were, clinical instruction under the actual conditions which existed in school life. That system interested teachers very much, and the practical value derived from it was very great indeed.

MRS. BADHAM (Maidstone) said she had come prepared to move a resolution on the training of girls in elementary schools, but found that the subject had been covered by Dr. Niven's paper. For many years she had worked in that direction, and believed that it was the only way in which they would be able to make good mothers in the future. How could they expect girls to become good mothers unless they were trained properly and led step by step towards accomplishing that desire? She trembled at the ignorance which obtains in the homes of England, and quoted a sad case which had come under her notice of a baby which had lived only three months, and had never been sober the whole time because the mother was a gin-drinker. They wanted to teach the girls not only how to rear and dress children, but also to keep away from intoxicants, because this alone would lead them to bring up a strong and healthy population. In the schools many things were taught to-day which were very useless, and instead of knitting stockings, the occupation of our grandmothers, it would be better if girls were taught to cut out and make children's clothes and sell them at nominal prices to poor mothers. Only by practical teaching of this character could we expect to have good mothers in the future.

THE APPOINTMENT OF QUALIFIED WOMEN WITH SPECIAL REFERENCE TO THE HYGIENE AND FEEDING OF INFANTS.

BY J. SPOTTISWOODE CAMERON, M.D., B.SC. EDIN.,

Medical Officer of Health for Leeds.

"WOMEN as Sanitary Inspectors" was the title of a paper read by the present writer in Exeter in August, 1902, and which appeared in the *Journal of State Medicine* in December of the same year. The subject was one, however, which had interested him for many years before. He had frequently talked it over with Dr. Tatham when the latter was medical officer for Salford, and later still for Manchester, before he went to the important post he now holds in the Registrar-General's office. The matter was indeed brought from time to time conversationally before the Chairman of the Leeds Sanitary Committee, but it was not till about 1897 that the Committee itself was prepared to act upon the suggestions previously made. The Women's Conference at the Congress of the Sanitary Institute held that year in Leeds passed a resolution which was sent to our Sanitary Committee, and at the November meeting I was asked to report on what particular duties might be allocated to a woman inspector, if one were appointed. In my report, dated December 9th, 1897, it was suggested that, if one woman inspector only were appointed, she would be specially charged with the duty of visiting workshops where women are employed. Her duties in regard to these work-places would be those of the ordinary workshop inspector, to watch over their cleanliness and ventilation, to prevent their being overcrowded, and to secure that no effluvium should enter the work-place from the drains or conveniences. The report entered somewhat into detail as to duties. It was further suggested that, if the Committee resolved to appoint several inspectors, one or more of them should be told off to visit houses where children under two years of age had died, except where these deaths were already being investigated in the ordinary way in connection with zymotic inquiries. The report then went on to remark that its infantile mortality is an important indication of the health of a town, and that it had in Leeds for many years back been unfortunately high. It was suggested that the woman inspector "should make a complete examination of the house and the outside evidences as to the state of its drainage, if necessary obtaining the assistance of the ward inspector" in testing the latter. It was pointed out that "one principal advantage of her visit would be her oversight of the condition of the house in regard to cleanliness, the treatment of the children in regard to diet, and what might be called the domestic part of hygiene as distinguished from that part of hygiene which is more connected with sanitary appliances, so called. She would be expected to be able to advise mothers what symptoms to be on the look-out for when infective disease was in the neighbourhood, and to have a sufficient knowledge of the early symptoms of infantile diseases to instruct the more ignorant among them in regard to those slight cases of infectious disease which are so exceedingly apt to be neglected, and to lead to the infection of other members of the family. She would advise the woman of the house as to the way to keep the trapped gullies about the premises clean, and the importance of doing so." She would also, it was hoped, "exercise her influence in persuading the housewife not to throw large quantities of vegetable and animal garbage into the dustbin." The report went on to say, "In going over the reports by the ward inspectors it has often struck me that there is considerable variation in regard to the returning of the houses they visit as 'clean' or 'dirty.' The addition of trained women to our staff of inspectors would probably raise the standard in this matter. Their advice to housewives upon the place for keeping food, and especially milk, upon the necessity for scalding the latter, especially in hot weather, their instructions as to the thorough cleansing and disinfection of the feeding bottle, would all be of great value as preventatives of infantile disease." This report was printed and circulated in January, 1898, and was followed by a further one, printed in March of the same year and reprinted in the following February, setting forth the results of inquiries made in several other towns as to the women there employed as sanitary inspectors. It was found that the amounts paid varied, even in Manchester, from 14*s.* a week to "health visitors" up to 37*s.* 6*d.* for the trained workshops inspectors.

In the year last named, the Leeds Sanitary Committee resolved to appoint two women as assistant inspectors, the qualification to be the same as for the men—the inspector's certificate of the Sanitary Institute or that of the London or Scotch Boards. They also resolved that the salary should begin, like that of the men, at 33*s.* a week. We were exceedingly fortunate in our first appointments. Two ladies of considerable attainments, both holding the certificate of the Sanitary Institute and both enthusiasts in regard to the work, were appointed towards the end of May in that year. At first their duties consisted largely of workshops inspection, although as part of their training both took a share of the house-to-house work which forms an important feature of our sanitary administration in Leeds. From the first all cases of puerperal fever were handed over to them, and they looked after the disinfection of the person and clothing of the nurse or midwife who had been in attendance. Before long we asked them to investigate the house conditions obtaining in autumnal diarrhœa, and as the Committee from time to time increased our staff we were able to develop their activities more and more in the second direction indicated in the report.

Now for some four years every death of a child under two years of age in a certain district of the town, with a population of about 34,000, has been investigated by one or other of our staff of six women inspectors. The district chosen was the one in which infant mortality was highest. In the beginning of 1905 we added to their duties the visiting of every house, in the same district, in which a child had been born, getting the information as to the birth from the local register, under the new rule of the Registrar-General; and during the latter part of the same year we have entrusted them largely with the care of infants in the same district, providing them, through the generosity of a voluntary association, with a supply of bottled milk, obtained under specially careful supervision.

I do not propose to say anything more about the duties of the women inspectors in connection with work-places, except to emphasise the enormous advantage that has accrued to Leeds from that part of their work, particularly in connection with the provision and supervision of sanitary conveniences. Their visits to work-places have enabled them to obtain information about the conditions under which married women in our workshops, and to a less extent in our factories, are employed. Their visits to houses also, even where simply inquiring into the cause of death of another child, have enabled them to exercise a certain amount of salutary influence in the homes of the district in which they more particularly work. But the chief interest so far as this Conference is concerned centres round the assistance rendered in the care of young and living children. Where a birth is reported through the registrar in the particular district to which this part of their work is almost entirely confined, they make inquiry of a more or less general kind into what would be called in a medical report the "family history" of the infant. This inquiry is, of course, more or less for scientific purposes, and so far as it has gone, especially when taken in conjunction with the similar inquiry made in regard to all deaths in the same district occurring in children under two years of age, has thrown considerable light upon the influence of certain circumstances upon the well-being of the child.

It has been made pretty clear to us that the infantile deaths are to a large extent connected with weakness or poverty on the part of the mother. Out of some 1,221 cases where we have investigated the family conditions after the death of a young child during the period from April 2nd, 1902, to April 14th, 1906, it was ascertained that the number born to the same parents had been some 5,208, whilst the number of those still alive at the time of our inquiry was only 2,582, or less than half. In addition, the same mothers had given birth to 167 still-born. We have not as a rule found that, at least in this district, the employment of women before their confinement has been associated very specially with the death of their infants. For instance, in the period already mentioned, of the 1,221 cases investigated, it was found in 199, or 16 per cent., that the mother had been engaged in some employment outside her own house before, though not necessarily close up to, the time of confinement, whereas in 1,022 cases, or nearly 84 per cent., this was not the case. Similarly, 122 out of the 1,221 began to work soon after the child's birth, but with 1,099, or 90 per cent., it was not so. We are rather led to think, although one would naturally not wish a woman to work up to the very time of parturition, that the wage earned by these expectant mothers is perhaps sometimes of considerable value to the health of the coming child and compensates to some extent for the disadvantages of work, at least if the latter be carried on in well-ventilated and carefully cleansed work-places. Of this matter I hope Miss Sharples, the head of our staff, will speak in connection with Dr. Reid's paper.

The conditions also of the dwelling-house are themselves of no inconsiderable importance, and it is here largely, and especially in regard to cleanliness, that so much can be done in assisting the mothers of the coming race. It is found as a rule that if care be taken not to hurt the feelings of those who are visited —if the work be done with tact and discretion—the help we are prepared to offer is welcomed. The new arrivals whom we see are not generally the very youngest, and it is here that our work differs in an important manner from the splendid attempt being made in Huddersfield. We rely as a general rule upon the receipt of the information as to the birth from the registrar. The average period from the child's birth to the date of our hearing of it from him we find, during 1905, to have been forty-two days, and in a considerable number of cases the birth and the death were registered at the same time; whilst in a few and not altogether inconsiderable number of cases the death of the infant has been actually registered before its birth, so that our visit to the house was in consequence of the death rather than of the birth of the infant. Dealing, however, with the cases of the young children of whose arrival we hear in the way mentioned, the woman inspector takes a considerable amount of trouble to persuade the mother of the importance of nursing or of continuing to nurse the child herself. This difficulty has presented itself. Whilst as a rule in this district the mother is quite willing to nurse her child, she not infrequently finds after she begins to get up and go about that she has not the requisite milk to give it. In some cases where this condition has been threatened, our inspectors have persuaded her to take herself the milk provided by the Pure Milk Association already spoken of. This action has been followed in many cases by a great benefit.[1] We generally find that in a very short time the mother begins to have a larger supply of milk for her child, and we regard this method of humanising cows' milk as by far the best. A small handbill couched in familiar language is given to the mother, and its purport explained by the inspector (see Appendix). It serves not so much as an actual instruction as a text upon which she can found her homily.

We have three of these small leaflets. No. 1 emphasises the importance of breast-feeding, and points out how it should be regulated. It advises the mother, for instance, to take a cup of milk or gruel shortly before suckling the infant, and deprecates, for the sake of the child, the use of stout, spirits, or beer. It then goes on to explain that the mother's milk may in some cases be advantageously supplemented by the use of a little pure cows' milk, and explains in what way cows' milk differs from the mother's milk. This handbill was prepared before we had the present supply of pure milk to offer to the parents, but the mother is advised that any milk to be given to the baby should be obtained as fresh as possible.

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[1] The milk so taken is, in the first place, unwatered; in the second place, it is reasonably clean, having been collected at a farm under careful inspection, cooled and placed in sterilised bottles by the Association, and kept stoppered until actually required for use. Its bacterial content as compared with the milk sold in the shops, often the same shops, but also in other shops in the same neighbourhood, is exceedingly small, and specially characterised by the absence of the group of bacilli associated with excrementitial matters so largely found in ordinary carelessly collected milk. As the milk is intended not only for mothers, but also for children, the udders of the cows from which it is drawn are examined at short intervals by the veterinary surgeon attached to the Corporation, so as to secure freedom from tuberculosis.

In this particular district, unless from the want of breast-milk just spoken of, we have usually not much difficulty in getting the mother to nurse her own infant. But it is of course necessary where the child is older, or where, notwithstanding the good intent of the parent, the suckling cannot be actually carried on, that some attention should be given to artificial feeding. Accordingly leaflet No. 2 deals with boiling milk. It will be readily understood from what has just been said about the supply of pure milk that the writer is not in favour of boiled milk. Boiled milk, however, is better than poisoned milk, and leaflet No. 2 indicates some reasons why milk is found so often to disagree with the baby, and explains in what way the milk may be treated so as to render it less likely to injure the child. The manner described is, in fact, that known as pasteurisation, which has this advantage over ordinary boiling, that the lactalbumen of the milk is not necessarily entirely coagulated and lost, and that the phosphates are not, to the same extent as in boiled milk, rendered insoluble. It will, however, be understood that where the mother or the child is getting the pure milk supplied by the Leeds Association, leaflet No. 2 is not always given. It is considered on the whole safer to recommend that the milk be taken from the stoppered bottle supplied by the Association; that it be placed in the cleansed feeding bottle along with a sufficient quantity of boiled water and a little sugar, thus representing to some extent, but without the sterilisation, the milk provided by certain town councils. The milk these towns supply has these three advantages: (1) that it is sterilised; (2) that it is supplied in the actual bottles to be used by the child, not therefore requiring to be transferred to the feeding bottle; and (3) that its food value is graduated to suit the infant to be fed. Its disadvantages, as it seems to me, are (1) that it is sterilised milk, milk therefore deprived wholly or in part of its lact-albumen, and in which the phosphates have been rendered largely insoluble; (2) that its use has not quite the same educative value. We are trying to teach the mother to prepare the milk for the child herself. We try to explain to her the importance of keeping the milk in a proper place, the necessity and method, under certain conditions of temperature, of herself sterilising the milk, if not that provided by the Association, when received, and we try to teach her also the proportion in which cows' milk should be mixed with water and sugar to furnish what the child actually needs.

The third leaflet is intended for distribution where the child is a little older. It represents one or two of the facts about cows' milk, and it deals, to some extent in a general way, with the quantities of milk to be given to the child. In all cases it is advised that if the child be ill or ailing medical advice should be sought, and our inspectors in no way assume to themselves, although acting under the immediate supervision of the medical officer of health, any right to prescribe for a child which is ill or to interfere in any way with the advice already given by any medical practitioner in regard to the dieting of a healthy or ailing child. In the bulk of the cases visited by our inspectors no medical man is in attendance. We also try to persuade the mothers that the milk provided by the Association is a food, and not a medicine, and we think that this actual visiting of the children and influencing their diet must in time conduce to a lessening of the high infantile death-rate in this particular district. The difficulties we labour under are that the children are many and the inspectors few; that even these few have other duties—important duties also—to perform elsewhere.

Amongst the latter, one of some special helpfulness in regard to the work amongst infants has been omitted. Our chief lady inspector is herself a registered midwife, and is charged, under the direction of the medical officer of health, with the superintendence of the women upon the register. Her staff assist in the necessary visitation, and gain much information serviceable to them in their work amongst infants.

Amongst the conditions that the writer looks upon as desirable in regard to women inspectors are the following:—

1. That their salaries should be at least those given to the men doing corresponding work. Our women inspectors, who rank as ward inspectors, begin with a salary of 33*s.* a week, rising at the end of two years to 36*s.* and then to 38*s.* This is quite little enough. Our head inspector has the salary of one of our divisional inspectors.

2. That none of the women inspectors should devote her whole time to visiting babies. It is better for her own health that there should be some variety in her work. For this purpose these ladies take their share in house-to-house work and in workshops inspection and in both sets of duties, as well as inquiring into cases of infectious disease in schools and factories; and in dealing with nuisances in the latter they gain information useful to them in their work amongst infants and their mothers.

3. That they should have opportunities of comparing notes, and that they should work under

a senior inspector of their own sex of some experience.[1]

4. Lastly, that, as women are greedy of work, are self-sacrificing, and often over-estimate their own strength, it is desirable that they should work under medical supervision.

APPENDIX.

Leaflet No. 1 is printed in two pages, 3½ ins. by 6 ins. The two pages face one another, and the type is pica. This leaflet is explained by the inspector. Nos. 2 and 3 are intended for the mothers of older children, and of those who cannot be fed naturally. Their sizes are the same. In drawing them up the endeavour to make them short was ever before the writer.

City of Leeds.

The Feeding of Infants (*No.* 1).

The best food for the young child is its mother's milk. Nothing but illness on the part of the mother should prevent the newly born infant from being thus fed. The child should have the breast every two hours till it is two months old, then for the third month about every two hours and a half, after that every three hours.

The child should be put to the breast as soon as it is born. The mother's milk quite at first will cause slight purging. This is good for the child. No castor oil is then needed.

If suckling is begun from the first, the mother will generally have as much milk as the baby needs till it is six months old. The mother may take a cup of milk, milk gruel, or milk and water, half an hour before suckling. It is far better for the child that she should not take stout, beer, or spirits.

If the mother's milk is not quite sufficient, the child may have a little cows' milk in addition once or twice a day. Cows' milk is stronger in the "casein" which makes the curd. It should, therefore, have a little water added, and, if possible, a little sugar and cream. Skimmed and separated milk, from which all or part of the cream has been removed, should not be given to children at all.

The milk given to the baby should be obtained as fresh as possible.

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[1] I find that ladies when writing to us for information about doing health work—and this was more especially the case at first—inquire if they are to work under the sanitary inspector or the medical officer of health. In many cases an educated woman of the middle classes seems more willing to undertake work under the direct control of a medical officer of health than under that of an ordinary sanitary inspector, however able and well informed.

Dr. John Robertson (Birmingham) said: There are, I think, two or three main points which present themselves for discussion on this subject.

(1.) No importance, I think, attaches to the name we give these women workers, for whatever name we give them the essential and vital part of their work is the same.

(2.) Much more important is it that we should have a clear conception of the main results which we desire their work to bring about, and the way this is to be accomplished.

(3.) Then we shall be able to decide what type of women are necessary and the number who should be at work in any particular district. There is a tendency at present to show some diffidence in speaking out quite definitely as to the women to be employed for fear of hurting the feelings of some of them, but the work is so important, and error may lead to such bad results, that I feel there ought to be no reserve in our discussion to-day. It is in the interests of the women workers that the best results should be obtained, for then I feel that more will be appointed.

Now, as to the results we anticipate from their work. A saving of infant lives is the main one, and this is to be attained by direct methods, such as visits to the homes where there is ignorance and carelessness in the rearing of young children. Indirectly the same object is being attained by securing that the homes of that increasingly large class in all our towns, who know not what domestic cleanliness means, shall be kept in a more wholesome condition. The babies and the cleanliness of the houses seem to me to be the essential work of these women workers. Work directed to the prevention of infectious disease, ring-worm, verminous heads, assistance in getting into medical and other charities, workshop supervision, and other specialised work should all be kept as subsidiary parts of the work.

I do not know of any other means we have of getting into the household where the real mischief exists. Voluntary effort on the same lines is excellent as far as it goes, but it is liable to flag after a few years. With paid workers we are entitled to hire those workers only who are cut out by nature for the work, while with voluntary workers we are often obliged to take the unsuitable as well as the suitable. The essential part of the work is educational, and it is by no means work which yields quick results, so that all workers must continue day after day without seeing immediate good results. I am quite sure that the town mother who keeps one of the typically dirty houses, and has had instilled into her by her associates, by her parents, and by the old midwife, most inappropriate methods of feeding and rearing her infants, is not going to be greatly influenced by one or two visits from any visitor. The bad habits of a generation are not going to be broken in a day. I am equally certain, therefore, that the actual good effects of this all important part of women's work are somewhat delayed. I get frequent inquiries as to what the infant death-rate was before the appointment of women workers and what it is now. This I think shows that there are a considerable number of people who do not realise the character of the work. I have even seen statements made and quoted from as to the enormous saving of infant life which one visitor caused as a result of a few months' work.

I shall be quite satisfied if I can see an appreciable saving in infant life after our seventeen Birmingham health visitors have been at work for ten years or so. I have now had ten or twelve years' experience of this class of work in three of our large manufacturing towns. In each there was observable a distinct improvement in the condition of many of the homes. They are cleaner and the children are cleaner, but I am not quite so sure that the traditional customs of feeding and rearing young infants are changing as quickly as I expected.

The point I would like, then, to emphasise is that this work of educating adult women who have ideas of their own is a very slow process. This is, however, one of the very important methods of combating infant mortality.

To carry out the work I believe that the best results so far as my experience goes are obtained by educated ladies rather than by women who are the peers of those visited. In addition to general education there must be special education, so that the visitor can speak with assurance on all the points which commonly present themselves for advice. Many of the best trained workers I know of have come from Bedford College, where their good general grounding has enabled them to appreciate points in their work which escape the notice of the less skilled.

Besides education there are natural gifts which make some women much more effective than others; a good deal can be done by training and example, but after all there is the born visitor.

No work that I know of in sanitary administration is more trying than that of health visiting, and it is therefore of prime importance that the visitor shall be strong and that her hours are properly regulated.

We have endeavoured to get the midwives of Birmingham to act as instructors of the mother as far as baby feeding is concerned, and this they are doing very well as far as they go. They will act with us in distributing correct information.

Another indirect help which our health visitors have been in the cause of reducing infant mortality is in getting information on points that wanted elucidating, such as the following:—

1. They find that among the healthy babies under six months of age, over 80 per cent. are breast-fed among the poorest classes in the city.

2. That among the bottle-fed babies the great majority have

been put on the bottle because the mother had no milk, or insufficient milk, or else the milk was thought to be upsetting the baby. In the great majority of these, regret was occasioned at having to give up the easier method of feeding. We must then find out as a first point some method of dealing with this cause of harmful feeding.

3. Many other investigations have been made by these visitors under my direction which are of the highest importance in directing preventive work, and there are still many more equally important observations to be made.

Dr. Moore (Huddersfield) expressed regret at some of the remarks which had fallen from Dr. Robertson, and felt that the statement that the author of the paper would be content if he could see an appreciable saving in infant life after seventeen Birmingham visitors had been at work for ten years or so, while true, was calculated to chill and damp enthusiasm. He pointed out that ten years ago women inspectors were appointed in many places, but up to two or three years ago there were no health visitors appointed directly for the purpose of concerning themselves almost exclusively in reducing the excessive amount of lamentable infant mortality which had been going on in our midst for so long. He moved the following resolution, "That in the opinion of this conference the appointment of qualified women specially trained in the hygiene of infancy is necessary as an adjunct to public health work."

Dr. Bostock Hill (Warwickshire) said the subject of health visitors was one in which he was greatly interested, and had had experience of their effect in towns. He desired, however, to specially refer to their work in the counties. Some two or three years ago he induced the Warwickshire County Council to try the experiment of appointing health visitors. It was an experiment, because the conditions of county sanitary work are so completely different from similar work in municipalities, as in the latter case the health visitors are appointed by the sanitary authorities, but in the former case they are appointed by the County Council, and there was some danger of clashing in the work. With a staff at the present time of four health visitors he could speak with great confidence of the immense value of the work they were doing. That work was largely to help mothers by getting them to allow them to go into their houses and advise them primarily on the treatment of infants, and also on the care of their farms and houses. They distributed leaflets and advised on all ordinary matters on which they were qualified to advise. Dr. Robertson said that he did not think there was much in the name by which they were called. His experience told him that there was a great deal of importance in that. He knew that many people were afraid of anybody with the title of inspector, and he was anxious to let the public understand that the work they were doing was not inspectorial, and that they were not entering houses to look for defects. As regards the type of women, after considerable experience he was of opinion that the Girton girl or educated woman was much better fitted for the work and gained easier entry into the houses, especially in the poor rural districts, than the type of woman trained from among themselves. His committee were also imbued with the idea that only women of a well-educated type should be selected in the county of Warwick. It was obvious that they should be paid well, and he was sorry to say they were not too well paid in Warwickshire. They began with thirty-five shillings a week, with a bicycle and travelling expenses. These wages were rather higher than those paid by the average municipality, owing to the fact that there would be more expense in having to travel about a large area, and owing to the fact that they would have to take lodgings. He quite agreed with what Dr. Robertson said as to not allowing health visitors to overwork themselves, and this was his greatest difficulty. He had to insist upon them taking frequent holidays in order that they might be fit to do their work. Another good thing was being done in Warwickshire, and that was in insisting that the health visitors should be trained midwives. The last appointed was a trained midwife, and the others were undergoing training so that they could act as inspectors of midwives. In this way great good was being done in the county, because thereby much time was saved in travelling about for the purposes of inspection. He hoped shortly in the future that a larger staff would be at his disposal, and he might mention that one of the functions of these health visitors was also to give elementary instruction in hygiene in schools. One visitor last year gave thirty health lectures on simple subjects, such as fresh air, sunlight and cleanliness. He held the view, at all events, that for the younger children the higher scientific hygiene was hardly applicable. He was convinced that some of the best work in the way of sanitation was now being done by health visitors.

Dr. Dingle (Middlesbrough) objected to requiring health visitors to be described as "highly trained." He was a great believer and firm advocate of lady health visitors, but his first experience of the highly-trained lady was unfortunate. That lady held so many certificates and was connected with so many movements that she was unable to confine herself to the duties for which she was appointed. She eventually vacated her position, and they obtained in her place by means of local advertisements visitors without such high qualifications, and the practical results had been eminently satisfactory. He believed that what was required in health visitors was practical knowledge and not scientific book-learning, and one who would be able to go and sympathise with the working women in their domestic trials and troubles. He did not think that lady health visitors were going to cure the evil of infant mortality. His experience was that there was a very small proportion of infantile mortality which could be prevented: at any rate, that was the case in Middlesbrough. The problem of infant mortality, in his experience, went farther back than to a position in which it could be remedied by the co-operation of sanitary officers. He thought the State should take part in the prevention of the excessive rate of infant deaths, and that the question was not one entirely for simple health visitation.

Miss Sharples (Leeds), having expressed her gratitude for the somewhat severe training which she and her staff had received in practical sanitation under Dr. Cameron, said that this training had formed a basis in their work in the prevention of infant mortality. The knowledge gained of health conditions in workshops and factories had been invaluable, and the insight into the condition of the children in the schools had also been useful. She was grateful to Dr. Cameron for having insisted on their status as inspectors, and she had not found they were less welcome in the homes of the people whom they had visited in conjunction with infant mortality work in consequence of their official position.

Dr. Sidney Davies (Woolwich) supported the resolution, which he regarded as one of the most important before the conference. He only desired to refer to one point which had occasioned a little soreness in the past, namely, the old question of practical knowledge as against theoretical training. Presumably no one proposed to go back to the condition when anybody was allowed to be a medical practitioner, and all recognised that medical practitioners must have a thorough training and pass examinations. But they all knew that when the medical practitioner began he had very little experience in his work. He had to gain that experience, and this must be to some extent the case with health visitors and lady sanitary inspectors. It would be excellent and desirable that they should get able mothers who had had several children to come forward and be health visitors and sanitary inspectors, but he did not think they would be able to get such persons. Most probably they would get just the kind of person who no one would want to give instruction, and that would be absurd. What they must get in the first place was a lady health visitor, and by using the term lady they did not necessarily mean of a high rank in society, but they meant a person of ladylike manners and of some refinement. Such persons were to be drawn from any class of society, and they had seen that morning an illustration of how a gentleman could be drawn from the working classes. The health visitor must have a thorough knowledge of elementary education, with suitable training for the work, and be able to pass the low degree of scientific knowledge required by the examination of sanitary inspectors.

Miss Carey (Westminster) desired to express a contrary view that it did not matter in the work which they had to do what they were called. She did not know whether the meaning was quite clear in the resolution, whether they were speaking for women sanitary inspectors, for women health visitors, or for both. Her own feeling was that the need for both was very marked, and that a clear distinction should be made between the two. Those who had experience of the work knew that as inspectors it was not merely a question of name. They had statutory powers and could insist on certain things being enforced. Women sanitary inspectors were first appointed because of the necessity of attention to detail. Without desiring to give any offence, she suggested that male inspectors were not always able to pay attention to the same small matters as women were able to do, and it was especially in attention to small details that women were able to do the very greatest work if they had the power to actually enforce those regulations which are essential if a country is to be healthy. Those women who were doing inspectors' work thoroughly could not give a large amount of time to health visiting, which required even more attention than inspection. She was therefore decidedly of opinion that the practice obtaining in Westminster of having a large number of health visitors who gave their time and labour voluntarily, and having one or two sanitary inspectors, who were able to come in when health visitors called their attention to defects, was really the best. Those who thought that workshop and factory conditions were subsidiary had made a mistake, for such conditions were not only not subsidiary, but were of the very greatest importance for the good of the district. Attention to details of sanitary defects, attending to gulleys and traps and things of that kind, which was always considered to be men's work, was of the very greatest possible value to the training of a woman. What was the use of a woman passing a sanitary inspector's examination unless she was trained in the actual work by doing it? A woman who passed the examination knew nothing about the practical work of inspection, and if she never did sanitary inspectors' work it was not likely she would be able to learn it. Some speakers were in favour of educated women being appointed, and all she hoped was that they would get many educated women to work for them at 25*s.* a week. As one speaker had suggested, the appointment of one inspector and health visitor would not bring down infant mortality. If such women made any difference it would be very slight. There was a danger in discussing this subject of using popular catch-words, but that would not solve the problem. A great deal had been said with regard to breast and bottle-feeding of infants, but, at any rate, her experience was that at least 75 per cent. of the babies are breast-fed, and of those who die as a rule at least as many are breast-fed as bottle-fed, especially in the case of respiratory diseases. It was not only a question of the mother, for they all knew that some of the best and strongest mothers, who looked after their children well, had the misfortune to lose them. This suggested that as much responsibility might rest with the fathers as with the mothers, and that aspect of the question was one which could not be left out of sight.

Dr. J. M. Rhodes said that as a general practitioner with a large practice, and having something to do with public health matters, he had made personal enquiry in his district as to the children under one year of age who died, and had found that improper feeding was the most fruitful cause of infant death. He did not claim to be an expert in the feeding of sick babies, nor did he think that a highly-trained lady visitor would be qualified to discharge that duty either. He believed the proper person to advise as to the feeding of children was the hospital trained nurse. He had also found that the death-rate in certain families ran very high throughout, and if this rate of mortality were to be reduced, it was hardly reasonable to suppose that persons only possessing certificates from universities or sanitary institutes were the proper persons to advise mothers in reference to the health of their children. It was well known that sanitary inspectors were suspiciously regarded by many people, and the presence of a sanitary inspector would be likely in many cases to defeat the object in view. Therefore his ideal help for suffering children, and the prevention of infant mortality, was a lady highly trained as a children's hospital nurse. If they obtained the services of such a class trained entirely for the teaching of children, the sanitary work could be left to the present inspectors and medical officers of health. If a policy of this character were adopted, he believed that in many districts infant mortality would soon diminish.

Dr. J. Spottiswoode Cameron (Leeds) seconded the resolution. He thought that the remarks which had been made with regard to the calling of these officers women inspectors or health visitors had really nothing to do with the resolution, because the resolution was equally applicable to either class. He hoped therefore that, important as the discussion no doubt was, they would consent to pass the resolution unanimously. Personally he preferred to call inspectors inspectors, and he preferred to have thoroughly-trained inspectors. He had given his reasons fully in the paper, but he did want to emphasise this, that a person trained in the hygiene of infancy does not necessarily mean a person trained in traps and gulleys, and that sort of thing. It did not mean necessarily a Girton girl, but he thought that he could make a better inspector out of a Girton girl than he could out of any woman casually selected.

The resolution was then carried.

The Lord Provost of Glasgow moved: "That the Education

Department be urged to add instruction in elementary hygiene with reference to the dietary and rearing of infants to their present scheme for systematically training girls in the senior classes in the practice and principles of personal hygiene and the elements of dietary." He said he did not think that a single word was needed to commend this resolution to the conference.

COUNCILLOR W. FLEMING ANDERSON (Chairman of the Health Committee of Glasgow) seconded the motion, and said he was glad to see the discussion had been well taken up by officials and medical officers of health. From his point of view, as Chairman of the Health Board of Glasgow, he supported the motion as a practical man. He wanted the education authorities not to so crowd their school curriculum with Latin and Greek roots or French and German languages, which were not going to be of the least use to the average mill girl, but to give her in her six or seven hours' school day a little teaching about herself and those children whom she was going to bear hereafter. That was so obviously a common-sense proceeding, that he did not think there could be any dissentient.

DR. SIXSMITH (Barry) pointed out that as the curse of commercialism had caused the destruction of Carthage in centuries back, he thought that anyone who travelled through London to-day could see similar influences at work in this country. Too much time and attention was being devoted to technical education, and we were killing people in factories and workshops all the time. He believed that excessive technical training was one of the causes of that physical deterioration in the country which we so much deplored to-day.

The resolution was then carried with one dissentient.

FIRST DAY—AFTERNOON SESSION.

THE PUBLIC SUPPLY OF PURE OR SPECIALLY PREPARED MILK FOR THE FEEDING OF INFANTS.

BY G. F. M'CLEARY, M.D. CANTAB., D.P.H.,

Medical Officer of Health, Hampstead.

AMONG the newer measures for the prevention of infantile mortality which have been increasingly adopted by sanitary authorities during the last few years, the public supply of specially prepared infants' milk takes a prominent place. Since the first British

Infants' Milk Depôt was established by the St. Helens Corporation in 1899 the number of these institutions has steadily increased, and we are now in possession of a fund of information relating to their work which was not at the disposal of the earlier workers in this movement. My own experience of the practical working of a milk depôt during a period of nearly four years has led me to think that the methods upon which the British milk depôts are generally conducted might with advantage be modified and extended, and that the time has now arrived when the whole question of the public supply of infants' milk should be thoroughly reconsidered, so that the Infants' Milk Depôt might be allotted its proper place in our collective organisation for the protection of the public health.

The Infants' Milk Depôt is a feature of the New Preventive Medicine, which is concerned not only with the hygiene of the environment, but also with the hygiene of the person; and its object is to prevent the heavy infantile mortality due to defective infant feeding. Defective feeding is, of course, not the only cause of infantile mortality; there are many other conditions which have not yet received the attention their importance demands, such, for instance, as the conditions affecting the unborn child during the period of gestation. Still, we may regard defective feeding as the chief cause ot infantile mortality, and it is certainly the cause which has of late years received the most attention from sanitary authorities. In most towns a municipal leaflet on infant feeding forms part of the circulating literature of the district, and usually the directions in such advisory leaflets are supplemented by the oral instruction of health visitors. The Infants' Milk Depôt should not, then, be regarded as marking a new departure in our methods of public hygiene. It is rather an extension of the system of municipal direction of infant feeding which was at work years before the first milk depôt opened its doors in the last year but one of the nineteenth century. Nor should the work of a milk depôt be looked upon as limited to the handing of bottled, modified, and more or less sterilised milk over a municipal counter. The main function of the Infants' Milk Depôt is to serve as the nucleus of an organisation for the feeding of infants under municipal direction and supervision. This is the point I wish to emphasise in the following remarks.

The infantile mortality dependent upon defective infant feeding is, broadly speaking, a mortality of hand-fed infants. If all babies could be secured an adequate supply of mothers' milk during the first twelve months, or the first nine months, or even the first six months of life, our mortality tables would present a very different appearance. Fortunately there is reason to think that, in most towns at all events, breast-fed babies are still in a majority. Hand-fed infants form, as Dr. Sykes has pointed out, a residuum; but the important point to remember is that it is this residuum that afflicts us with the enormous mortality from diarrhœa and malnutrition against which our preventive methods have hitherto been chiefly directed. There are two ways of dealing with this residuum of hand-fed infants. One is to promote breast-feeding, so as to reduce the residuum to the smallest possible dimensions; the other is to improve the artificial food supplied to the hand-fed infants so that their hand-feeding may do them as little harm as possible. Broadly speaking, it may be said that while the encouragement of breast-feeding is the chief feature of the French methods of preventing infantile mortality, we in this country have devoted ourselves mainly to the improvement of artificial feeding. The Infants' Milk Depôt may be made a means to promote both these objects if it be conducted somewhat on the following lines.

In the first place, it is important that the milk should never be supplied in such a way as to run the risk of discouraging breast-feeding. Care should be taken to admit to the depôt only those infants for whom satisfactory breast-feeding is impossible to secure. During the last year I was connected with the Battersea depôt the milk was not supplied for an infant under nine months unless the mother could satisfy me, by the production of a written recommendation from a doctor or otherwise, that she was unable to suckle her child. In this way I was able to persuade a number of mothers, who would otherwise have prematurely weaned their babies, to continue to suckle. In some cases, where it was impossible for the child to be wholly breast-fed, partial breast-feeding was secured, the mother's milk being supplemented by a supply of cows' milk from the depôt. In all cases, however, the applicants were repeatedly assured that the depôt milk, like all artificial foods, was but a poor substitute for mothers' milk. I would urge the importance of taking precautions of this kind. If the milk is supplied to all applicants without discrimination we lay ourselves open to the charge that we discourage breast-feeding and are, therefore, guilty of *lèse maternité*.

Secondly, the infants should be under periodical medical supervision. In the French institution, the Goutte de Lait, from which our milk depôts are derived, the chief feature of the work is not by any means the distribution of the milk, but the systematic weighing and medical supervision of the infants. Every week the baby is brought to the depôt, where it is weighed and examined by the medical director of the institution. Most of the British milk depôts lack this direct medical supervision,[1] but a certain amount of indirect supervision is secured by the domiciliary visitation by lady inspectors and health visitors, acting under the instructions of the medical officer of health. This domiciliary visitation is very valuable work. The mother can be influenced and instructed with more effect in her own home than anywhere else. In the work of the Glasgow depôt, however, the advantages of both methods are combined. Within the last few months the Corporation of Glasgow has appointed a lady doctor to visit the homes of the infants fed from the municipal milk depôt, and to weigh the babies and supervise their progress generally. This appointment is a valuable and significant development of the work of the Infants' Milk Depôt. It marks a new departure in preventive medicine by bringing medical women into the practical work of public health administration. Public health work is work for which women doctors are especially well fitted, and it is to be hoped that the number of medical women employed in such work will be much increased in the future. I should say, however, that Glasgow is not the first town to enlist the services of medical women in the prevention of infantile mortality; that honour belongs, I believe, to Huddersfield.

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[1] Systematic medical supervision of the infants is one of the chief features of the work of the Finsbury Infants' Milk Depôt, which was established in 1904 under the direction of Dr. Newman.

There is no reason, however, why the advantages of this systematic medical supervision (including weighing) need be restricted to the babies fed on the depôt milk. Nursing mothers should also be encouraged to bring their babies to the depôt to be weighed and supervised. In this way it would be possible to secure a continuance of breast-feeding for many infants who are now prematurely weaned. Many women give up suckling, and deliver up their babies to the bottle on the advice of ignorant friends or relatives because their milk appears to disagree with the baby. In such cases what is wanted is not the premature weaning which now too often occurs, but a skilled regulation of the mother's diet and mode of life so as to make the milk more suited to the baby's needs. This could be ensured by a system of municipal supervision of sucklings. I see many possibilities in the system of municipal supervision of infant feeding which has been developed by the milk depôts. We have heard a good deal lately about the medical inspection of school children, but the medical inspection of infants is equally important and necessary. At the present time many mothers do not seek medical advice on child-rearing until the child is already ill, often so ill as to be beyond the hope of recovery. It would be far better that such advice should be given to her while the child is still healthy. I have no doubt that the medical supervision of infant-feeding by municipal doctors for the purpose not of curing, but of preventing disease, will become an important feature in our system of State medicine. We are awaking to the realisation that every baby born to us is a national asset; and sound national policy no less than humanitarian feeding dictates that no effort should be spared to secure the physical efficiency of those to whom will be committed the future of our country.

There is another way in which the practice of the British milk depôts might be improved. In all our depôts, so far as I am aware, the milk is either sterilised or pasteurised; and without entering upon a discussion as to disadvantages of sterilised milk, which I think have been greatly exaggerated, we must all admit that it would be better to supply the milk pure and uncooked if it could be done. All methods of milk purification having for their object the neutralisation of existing pollution, such methods as sterilisation, pasteurisation, centrifugalisation, or filtration, we must regard as makeshifts, to be abandoned when better methods of milk production become practicable. Is it possible by strict veterinary supervision, combined with aseptic methods of milk production, the employment of bottles, and the free use of cold storage, to supply raw cows' milk to infants with impunity? The experience of the Municipal Infants' Milk Depôt at Rochester, U.S.A., where such methods have been in operation for the past seven years, shows that it is quite possible to do this provided that the complete control of the processes of production, from the care of the cows onwards, is in the hands of the responsible officers of the municipality. The municipal cow is a necessary complement of the municipal milk depôt. If the methods of clean milk production, which have been employed with such success at Rochester, were adopted in the British depôts, not only would the quality of the milk supplied be greatly improved, but an object-lesson of great value could be given to the dairy farmer. An ounce of example is worth a ton of precept. One model municipal dairy farm managed on scientific methods would do more to promote the production of pure milk than any number of reports and papers on the question of the milk supply.

In conclusion, I would again urge that the Infants' Milk Depôt is very much more than a municipal milk-shop, a place where municipal milk is handed out to anyone who chooses to ask for it. It is, or at all events it should be—(1) an important educational influence, a school of infant feeding, the centre of a system of municipal supervision of infant feeding; (2) the source of a pure milk supply ; (3) an object-lesson in the production of pure milk. It is by the attainment of these objects that the Infants' Milk Depôt will achieve its justification, its permanent place in our system of preventive medicine, and its ultimate success.

Dr. J. M. Rhodes (Chorlton Board of Guardians) observed that in one thing the conference would be unanimous, namely, that the children should have pure milk, and the question he had to ask was, if under the present circumstances thousands of people in this country give their children pure milk ?—(A Delegate : They cannot afford it.) Even if the people could afford it, they could not get pure milk under the conditions in which they live in large towns. Let them think of the conditions of many houses in which the privies were close to the back doors, with the result that there was continual contamination of the food in the house. Even if sterilised milk were supplied to the people, it was useless in face of the degradation of filth, as Kingsley called it, which was so marked a feature in working-class houses. As hon. secretary of the National Society for the Protection of Children, he had visited most countries in Europe, and knew the conditions under which people lived, and he could say, "Show me the sanitary state of a town, and I will tell you what is its rate of infant mortality." Take a town like Manchester; in one part its infant mortality was 90, and in another part of the town it was over 200. What was the reason of that? The milk went in the same train, and was delivered in the same carts. The explanation was that in the slum dwellings the milk became infected and contaminated, and he particularly called attention to the house-fly as a potent agent for infecting milk and food. Statistics as to diarrhœa indicated what took place. In the first three months of the year there would be only 60 deaths, in the second three months of the year there would be 70 deaths, but in the third three months of the year the deaths rose to 600; surely it was not simply the food which the child ate which accounted for so much disease, because the food of the child was the same all the year round. It was the condition of the food when the child received it which was responsible for disease and sickness. He knew a lot of people did not like criticism of this character, but he could not help thinking that as long as the people of England were fools enough to return property-jobbers and house-sweaters to corporations and local governing bodies, so long would the present undesirable state of things continue. He hoped that every member of a corporation would raise his voice against allowing this curse of the community to continue.

Dr. G. Newman (Medical Officer of Health for Finsbury) said: I was asked by the Secretary of the conference to read a short paper following on that of Dr. M'Cleary, but after seeing a copy of that paper I have come to the conclusion that there is very little for me to add to it. My own experience of milk depôts leads me to look upon them as one of the methods, and not the only method by any means to be adopted, in some places, not in all. I think that they serve as a supplementary factor in our methods of preventive medicine in regard to infant mortality, and from the experience we have had in Finsbury, where we have a small depôt which has been in existence since November, 1904, working rather broadly along the lines which have been laid down by Dr. M'Cleary, I think we may fairly draw four conclusions, and these I will briefly refer to: (1) That the supply of milk from these depôts should be restricted absolutely to children who cannot be breast-fed. I think a great deal of harm may have been done to these milk depôt movements by the more or less indiscriminate supply of milk. This leads some members of local authorities, particularly members of the dairy trade, to think that these depôts are in the nature of milk shops. Personally I look upon them as much more in the nature of clinics, as schools of infant feeding, than milk shops. They are to be restricted, as far as we possibly can, to the feeding of children who cannot be breast-fed. I think if they are supported out of the rates we must be particularly careful to see that we interfere as little as may be with the ordinary milk trade, which should be controlled through the ordinary channels of legislation and bye-laws under the "Dairies and Cow-sheds Order." We want to control them as sanitary authorities, and we want to endeavour to exercise legal and vigorous control of the ordinary milk supply without in any way attempting to make these depôts a kind of municipal milk shop. (2) The conclusion to which I think we have been led in Finsbury—which we have practically proved from the beginning—is the value of the regular medical supervision and weighing of each child at the depôt. Thus we have been enabled to make clinical records and preserve the life history of each child. Now we have only had a small number to deal with, from 205 to 210 children, but each of these children is regularly medically supervised, examined and weighed once a fortnight, and if they do not come up for their weighing and examination they do not get the milk. In that way we are able to exercise a direct control—though not absolutely a complete control—over the modification of the milk that the infant is having, and we are able, from fortnight to fortnight, or from week to week, as may appear necessary, to change the modification of the milk according to the requirements of the case, either going back to a weaker milk or going on to a stronger milk. (3) I think that a milk depôt requires most careful home visitation, either by a doctor or a lady visitor, experienced hospital nurse or midwife. We have been extremely fortunate in Finsbury in having such a lady visitor as we have had. I attribute a good deal of the success of our measures, not only to the controlling of the milk supply, which we happen to be fortunate enough to be able to exercise, but also to the extreme advantage which has resulted from the visits of our lady visitor. She has not only been able to teach the right use of the milk, but has been able to eliminate from the home influence of many of these children features which are of an injurious character, and she has also been able in many ways to increase and foster maternal responsibility. That seems to me to be a matter of the greatest importance in respect to the work of a milk depôt, by taking means to increase maternal responsibility. (4) Then there is the control of the milk. I have elsewhere for some time past urged that the control of milk and these milk depôts should begin at the farm instead of having large quantities of the milk brought into towns and then sterilised. Whatever modifications milk is to pass through, whatever manipulations it is to receive, it should receive immediately after milking at the farm. Now, I am afraid this is very often a counsel of perfection. It is a very difficult thing to arrange. It is only by good fortune that we in Finsbury have been able to have for our chief cooperator Mr. Carson, of Theydon Bois, in Essex, who is able to treat his milk at an excellent dairy farm, one of the finest dairy farms in this country. There he is able to treat the milk at the farm immediately after it has been milked, and I think if possible that should always be done, and it must be remembered that this is an urban and not a rural problem. It is for urban districts, and it is specially at the central parts of those districts that milk is most required, and I fear that unless we are very particular about this question of early controlling the milk supply, much of our labour will be in vain. We shall merely be bringing up large quantities of excellent milk, but it may be twenty hours before we begin to treat it, and anyone who knows anything about the bacterial contamination of milk knows very well that after a few hours whatever mischief is going to be done is largely done. What we want to do, if any scheme can be devised for doing it, is that all depôts should be controlled, and that the modification of the milk, and if necessary the pasteurisation it is going to receive, and the bottling, should be done at the farm before the distribution in the town. That we have been able to do in Finsbury, but it has been a difficult task, and when we came to put the milk in the bottles there was a further difficulty, not only that there are so few satisfactory farms—farms which are really of the very first order, and in which food is kept in the same sweet, clean condition as it is on show or exhibition days—not only that there is unsatisfactory dairying which can only be slowly overcome, but there is the problem of milk transit in bottles, which is practically a different problem to the transit of milk in churns or in bulk. There is no little difficulty in bringing up milk in 500 or 600 bottles in the right order, and so that none of it churns, particularly where there is only a small quantity of milk in a six or seven-ounce bottle. I am sorry to say that that has led on one or two occasions to some difficulties, but, on the whole, our difficulties have been overcome, and we have been able to feed these 205 children. Each is receiving medical supervision, and in each case they are not able to be breast-fed, and almost all of the 205 children who have been brought to us in poor condition, and gravely ill, have been reared. We have only lost 13 cases, so that I can venture to suggest to this conference that so far as possible we should endeavour in our milk depôts to emphasise these four cardinal principles for our work in this direction. I may add a point which is of less importance, but still not without its importance, namely, that the milk should be sold at market prices; that the expenses of the depôt only, the expense of the management and distribution, should fall on the rates, and that the children who come to the depôt, and who are too poor to pay the necessary market price, which will range from 1*s.* 6*d.* to 2*s.* per week, should be supplied with tickets by the Poor-law system under the form of outdoor relief. We have tried that in several cases with considerable success, at any rate with a success which would justify us in doing it if more cases came to us in which the parents could absolutely not afford to pay the market price of the milk. I venture respectfully to put in a plea on behalf of municipal milk depôts being run on scientific principles rather than as schools of infant feeding, domestic management, and infant management generally: that they should be run only for those children who cannot be breast-fed, and not as milk shops, for that is making the experiment neither a fair municipal nor a fair scientific one.

Dr. Somerville (Marylebone) desired to bring before the conference two or three points which had arisen after a scientific investigation, which had commenced last year, with a dried milk. They had all heard how impossible it is at the present juncture to obtain for the great bulk of the poorer parishes of our large towns milk in a pure condition. The milk supplied at the present time to the poorer classes of London, Manchester and other large English towns, contains an enormous number of bacteria. The bacteriological world at the present moment was not in a position to stop that trouble or to decide as to how a better state of affairs could be induced. He fully agreed with everything Dr. M'Cleary had stated in his paper, and with all the points raised by Dr. Newman, but he wished to point out that bacteriological improvement in connection with milk supplies could be effected to a great extent in his opinion by feeding certain classes with the material mentioned. In October last he carried out a series of artificial experiments on the product, and he found it to be more digestible than ordinary cows' milk. This dried milk, which came from New Zealand, was of standing composition, rich in fat, and what could not always be said of English milk, it was absolutely sterile. Some tins had been placed on his laboratory shelf nine months ago, and they were sterile to-day. He therefore gave this suggestion to municipal authorities, as it might help them in dealing with this terrible problem of the bacteriological examination of milk. He had been assisted in November, 1905, by Dr. Harper in regard to the clinical side of the subject. They had selected a centre in Central London, one of the poorest quarters, and had a dispensary from which they distributed, carefully weighing and adjusting meals for infants suited to their age and condition. These meals were sent to the homes with careful instructions how to reconstitute the milk and how to feed the child. Careful records were kept as to date of birth, date of commencing the food, type of child's constitution, and other necessary details, including symptoms of diarrhœa, teething, and so on. When they had passed through fifty cases it was thought only right that the public should know something of the work. Since November last fifty-five cases had been treated for six months; thirty-seven had lived entirely on the product for three months with no ill effects, scurvy, or anything that could be recognised. In every case there had been improvement in the child, a large weekly improvement in weight sometimes reaching to eight or nine ounces. In a large number of cases six ounces was the weekly average, for the whole of the fifty-five cases six ounces, while four ounces per week came up to the ordinary standard. They thought that until there were better times for the control and distribution of the milk in towns by municipal authorities, it would be possible that a great deal more might be done by using the milk as they had suggested, because it had several inherent advantages, as he had already pointed out. In the experiment which they had conducted there was a great deal to encourage them in looking at the matter from this point of view, especially as they were able to test it thoroughly before proceeding; at any rate, it seemed to offer several advantages over the bacteriologically foul supplies with which they were constantly face to face at the present time.

Dr. Vincent (Infant Health Society and Infants' Hospital) maintained that the question was not really a medical one, but one of the greatest social importance to everyone, and one of the most encouraging things in his experience had been the work of Mr. Broadbent, the Mayor of Huddersfield. Not only was this a medical and lay matter, it was still more a scientific matter, and one of the most terrible things in this country was the fact that there was a large number of authorities on the question of infant feeding who did not know anything about the subject. His experience was based on the feeding and care of many thousands of infants, and it was most important that those who were prepared to advise others on these subjects should be right themselves. It was no wonder that mothers were so ignorant when so many leaflets containing false instructions and harmful advice were being circulated through the country. Indeed, it would be impossible to rear a healthy infant if some of the instructions in circulation were followed; but looking at the matter from the point of view of science and the health of the nation, as he had stated in a paper read at a congress last year, entitled "Popular Methods for Prevention of Disease and Mortality among Infants," one of the most important things they had to do in this country was to decrease infant mortality. Unless they had a first-class food, and that first-class food he meant should be a food answering to all the requirements of the best quality of human milk, they could not accomplish this end. It was said that by no artificial means could there be produced a food equal to human milk. He did not know whether they would realise that such a statement meant to a physiologist a complete revolution of all his knowledge and to the chemist it made senseless all his work. The fact was that the human milk was the most splendid food for the infant because it was a wonderful and subtle combination of fat, proteids, lactose, and the like. But if they respected that composition and followed Nature's teaching they would be able to produce a food containing all these requirements. It was a bold statement to make, but he was prepared to undertake to feed half-a-dozen infants by proper methods, substituting a certain food, and the development of those infants would be in every respect as to teeth, weight, height, and so forth, comparable with the best kind of breast-fed infants. (Signs of dissent, and cries of "Name the food.") If that were possible it was of vital importance, and was one of the most serious subjects that they had to consider in the question before the conference.

The closure was here agreed to, the speaker being understood to say that he was about to explain the food he mentioned.

Mr. Theodore Dodd (Oxford) said he would very much have liked to have heard the name of the food mentioned by the last speaker. While thanking the medical men who had given the conference their papers, he desired to suggest that something might be done to assist them by the various boards of guardians. He was glad to hear from the reader of one paper that the board of guardians in his district did pay for municipal milk for the people who needed it. He thought that there were some people who hesitated very much to receive ordinary out-relief, and in such cases milk might be given by way of medical out-relief. If the doctor ordered municipal milk for the baby, the guardians would give that milk as being ordered by the doctor, and that would not disfranchise the parents. It was sometimes very hard that a poor workman should be disfranchised, and (as he considered) more or less degraded, because his baby was ill, and wanted proper milk. He thought, moreover, that boards of guardians might do a great deal more than they did with regard to stopping infant mortality. Old-fashioned boards of guardians had scales of relief which provided so much, or rather so little money, and a loaf for each child. He thought that scales ought to provide, as a matter of regular out-relief, milk for the young children. It was far better than giving bread. Boards of guardians might also do something to encourage the breast-feeding of infants. If they gave milk for infants, it might be an inducement to mothers receiving relief not to feed the infants themselves so as to get the milk to give to the other children, but where the mother was feeding her own child she ought, where necessary, to have some extra milk or food for herself prescribed by the doctor. Guardians very naturally required that an able-bodied woman in receipt of out-relief should do what work she could; but the guardians should make such provision that the work she had to do should not conflict with a woman's first duty, which was nursing her own children. That meant there would have to be a change in the minds and hearts of the guardians of this country, and the conference should be the means of effecting it. They had heard the speech of the President of the Local Government Board that morning, and if that Department were to write to the boards of guardians suggesting that they should endeavour in their own districts to do their best to reduce infant mortality, he believed there were many districts where the reduction would be very large in consequence of the assistance of the boards of guardians. Another point in Dr. M'Cleary's most excellent paper appeared to be of most special value, namely, the importance of medical inspection of the children. The law provided many things which would be an advantage to the people if the administrators would only carry them out; and the law provided that a person was entitled to medical relief if ill and otherwise unable to obtain it. As Mr. Gerald Balfour had told them, a destitute child was also entitled to help. A parent might therefore apply for medical help for a child as soon as it began to be ill. That was the law, but it was differently carried out by boards of guardians in different districts. He had read lately of one board of guardians which had been busy in cutting down medical relief generally by making applicants come before a committee, and the board seemed quite pleased with the result. There was a high rate of infant mortality in the district: he did not say the one was caused by the other, but the two went together. It therefore appeared to him that they must try to induce boards of guardians not to discourage but to facilitate medical relief in the case of infants if they desired to put an end to high infant mortality.

DR. J. SPOTTISWOODE CAMERON (Leeds) observed that in his paper he had alluded to a little experiment which had been going on for some months in Leeds in regard to the milk supply, and it bore upon the remark of Dr. M'Cleary that nowhere, except in New York, had the experiment of supplying pure milk been tried. A committee, consisting of part of the Sanitary Aid Committee and part of the Ladies' Council of Education, were thinking of establishing a milk depôt somewhat on the lines indicated by Dr. M'Cleary and had got as far as considering ways and means. They applied to the Corporation for help, and the Sanitary Committee offered the committee £500 if that committee would run the show—it was practically what they meant—and appointed two members of that committee and himself to be members of the general committee, which then endeavoured to make the necessary arrangements. Many places were visited, and it had struck him that it would be desirable to go to the farm rather than to take the milk sent in by rail. After a time the general committee came to the conclusion that they could not carry out the scheme, and went back to the Corporation. The Sanitary Committee then decided to undertake the scheme themselves, and he was given authority to make certain arrangements. A resolution was passed sanctioning the purchase of certain plant and cooling machines, bottles, and so on, and arrangements were made with the Parks Committee for the use of a room near a farm. Arrangements were also made with the farmer to take the milk down to the cooling room, and, in fact, the details had been all arranged as if the Corporation were going to carry out the scheme. They were then met with a difficulty. The town clerk ruled that it was an illegal expenditure of public money. In vain was it pointed out that the same thing had been done in Battersea, where the disallowance and surcharge had been repealed by the Local Government Board, that it had been done in Liverpool without objection, and in Glasgow and St. Helen's. Still the expenditure was held to be illegal, and unfortunately there were opponents in dairymen and others who did not want the competition of a corporation milk supply. It was pointed out that competition with them was not intended, but they held to their views, and as a consequence they were thrown back upon the Lord Mayor of Leeds, who had unfortunately to rule the expenditure out of order, but was kind enough to give £200 for the scheme to be started on private subscription. The working was this: they went to the cow, and the veterinary inspector of the Corporation inspected all the cows at the farm. One of the inspectors saw the milking done, and one of the employees of the association assisted at the milking, so that practically there was supervision of the milking. The first draw from the udders was rejected, and the milk was taken in their own cans which had been sterilised. It was then taken about 200 yards to the cooling place, where it was put through an ordinary circular cooler and then bottled with an ordinary bottling machine. It was cooled to a temperature of about 40 degrees. It was sent out in only two-sized bottles, pint and 6-oz. bottles. The pint bottle was sold at 2*d*., generally speaking, and the 6-oz. bottles three for 2*d*. So far it was simply cooling milk, and it was distributed through the association by the women inspectors, and it was only done by tickets. The milk was put on the market at something more than the market price.

Dr. L. S. McManus, as an old member of the Battersea Borough Council, explained that most of the recommendations and suggestions made by Dr. M'Cleary, Dr. Newman, and Dr. Somerville had been carried out by the Battersea authority. They got as far as possible pure milk from the country, sterilised it and humanised it. There were distributing centres and a day in the week appointed for weighing the babies. In answer to Mr. Theodore Dodd, he could say that the medical officer attended the weighing, and if there was anything wrong with a child, as regards weight or general appearance, the parents were advised to call in a medical man at once. He desired to add what Dr. M'Cleary had not said, viz., that the scheme was due entirely to Dr. M'Cleary's initiative; the credit was due to him and not to the Battersea Borough Council. That gentleman had practically educated a body of so-called Progressives who were extremely ignorant of municipal hygiene, and he had earned the everlasting gratitude of all the mothers and babies in Battersea. In fact, Dr. M'Cleary had lit a torch of municipal hygiene which would never be extinguished in South London, and those who were left behind him intended to carry on his good work. He had found Battersea a hygienic desert; he had left it a hygienic oasis. But in spite of all their precautions, and every precaution that was humanly possible was taken to get the milk delivered pure at the depôts, he was reluctantly compelled to say that there was no trade in connection with human food so fraudulent as the milk trade. If they did not cheat in London, they did at the railway station, or in the country some British farmer started by putting boracic acid in before sending it to the railway. Therefore Battersea was in favour of the municipal cow, and sooner or later they hoped to set the example by the municipal provision of milk which would be properly testified and certified for use by a particular class of children. Not for a moment did they contemplate competing with the milk trade, but they were determined that the more helpless section of the community should be supplied with a pure beverage or food.

Alderman Dr. J. Gay (Wandsworth) did not wish for a moment to underestimate the value of Dr. M'Cleary's method of feeding children on sterilised milk—it was a splendid idea—but it did occur to him that to some extent they were losing sight of the proportion of things. There were a great many other questions concerned with the subject of infant mortality than the milk supply. In Battersea there was an experimental plant for providing sterilised milk at ordinary prices, and there was a deficit every year. Of course, the delegates were not there to consider the question of the expense, but somebody had to pay it. Although they would not wish to put the question of expense before natural advantages to the children, still the position must be considered. A neighbouring borough to Battersea, with a very large area, had considered this question for itself, and had come to the conclusion that if suitable places sufficiently extended for carrying on the work were built, the deficit would be £200 a year. In Battersea he believed the deficit was perhaps £1,000 or £2,000 a year. If that were to do all the good £2,000 a year would be cheap, but did they after all reach the class which they wanted to reach? On enquiry their impression was that the children who reaped the advantage were those in institutions under the Infants' Protection Acts, children in infirmaries and various institutions, who were all very carefully watched, inspected and cared for by foster mothers, who could not do otherwise than be careful over the food. It was that class mostly who went for the milk—a class which, whether the milk was provided or not, would see that their children were properly fed and attended to. Let them provide sterilised milk as cheaply as ever they could, there would still be a residuum which would not be touched, and the question arose as to what was the best way of getting at, not the careful mother, not the inspected and cared-for children, but at the careless, ignorant mother, and the class of children who really required looking after. It seemed to him that instead of spending that £2,000 a year on a depôt, it would be better spent on lady sanitary inspectors, who would go round to the class really needing attention, giving them advice not only as to the milk but as to their general surroundings and condition, which contributed largely to infant mortality. That seemed to be a fair question to put to the conference—What was the right direction in which to develop the milk depôts? Was it on lines chiefly of milk depôts or on lines of sanitary inspection, which was so important in densely-populated towns?

Dr. M'Cleary, in reply, said it was not, as Dr. Gay had seemed to imply, a question of choosing between two methods at all. They should adopt all methods. He had expressly alluded in his paper to the great importance of domiciliary visitation and medical inspection, and what he had advanced was in no way contrary to the suggestions thrown out by Dr. Gay. With regard to the remarks of Dr. Vincent, the statement that he could prepare a food equal to human milk had filled him with astonishment. If Dr. Vincent considered that by test-tube methods he could make a cow's milk in any way approximating to human milk, all that could be said was that he had not studied as carefully as he ought to have done those scientific text books which he mentioned.

PREMATURE BIRTH IN RELATION TO INFANTILE MORTALITY.

By JAMES ROBERT KAYE, M.B., Etc.,

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Amid so many disheartening stories of the present-day sacrifice of the innocents a natural question arises: How do we compare with past times? And there is at first sight some comfort in the reflection that at all events we are in this matter no worse than our parents, so far as the evidence of crude statistics goes. In the twenty years ended 1874 we find that out of every 1,000 children born alive in England and Wales 153 never completed their first year, while in the twenty years ended 1904 the ratio was 148 per 1,000. Apparently therefore this problem of infant mortality is not a growing one when viewed merely in gross figures. But then comes the reflection, How is it that with all the recent spread of knowledge, with the betterment of the material conditions and sanitary environment of the masses, and with the many increased comforts of life, we have not been able to further reduce this initial drain on the new life of the nation? The reduction to which we can point is insignificant in comparison with the great saving in the general death-rate which is rightly claimed as the result of half a century's progressive sanitation. Our general advancement in hygienic environment, one would think, cannot have benefited the adult members of the community without, at the same time, improving in many ways the lot of the infants. If the latter view be sound, then the fact that no corresponding improvement occurs in our infantile statistics must be due to the influence of fresh forces which have arisen to counterbalance the benefits of modern sanitary administration and social advancement. First among such possible influences to be pointed out is the feeding question. But errors of feeding were not unknown previously, for one reads as follows in the Registrar-General's report for 1846: "Infants of the poor" (speaking of Chorlton) "are many of them fed upon innutritious and improper food, and a large proportion of them in this district are constantly drugged with narcotics such as 'Godfrey's Cordial,' paregoric, and miscalled 'infants' preservatives.' They live in unhealthy localities in ill or non-ventilated dwellings, surrounded by an atmosphere pregnant with noxious exhalations." In the same year the Registrar of Manchester speaks of "little children brought up in unclean dwellings and impure streets, left alone long days by their mothers to breathe the subtle sickly vapours, soothed by opium (a more cursed distillation than hebenon), and when assailed by mortal diseases, their stomachs torn, their bodies convulsed, their brains bewildered, left to die without medical aid." One more extract from Heaton Norris: "Of the 120" (deaths) "fifty-three were children of one year and under; and of these deaths of infants the causes were certified by a medical attendant in only twenty-eight cases. It is to be feared that many at this age are lost for want of medical assistance and care of the mother, who is soon obliged to leave her child in other hands and go forth to engage in constant and unwholesome toil. The child sickens and is soothed by opiates."

Now surely we have mitigated a lot of the evil conditions referred to; we have wiped away insanitary circumstances and nuisances by the thousand, improved the conditions of labour, and especially female labour, legislated for the protection of infant life, and instituted a system of inquiry into the causes of uncertified deaths. Yet the corresponding diminution in the rate of infantile mortality does not appear, presumably because new agencies have arisen to prevent it. The gradual abandonment of natural feeding may be cited as a likely cause, but, important as it undoubtedly is, I cannot but think that it is only *one* of the causes at work. It would be strange if its effect alone should be sufficient to outweigh the accumulated effect of the great advancements in sanitation and education. Fifty years ago more than half of those who married were unable to sign the register, while to-day the proportion of illiterates is only about 2 per cent.

It seems to me that a careful study of the whole subject points strongly to the existence to-day of grave functional and sociological factors operating in a manner far more subtle and difficult to arrest than the causes which lie on the surface. In endeavouring to sort out the manifold forces which go to produce our infantile mortality due importance cannot fail to be given to the climatic and other conditions which cause extensive seasonal movements in the death returns. One aim of the sanitarian is for the future to hold such movements in check by teaching mothers how to adapt the feeding, clothing, and nursing of their offspring to the requirements of age and season. The tragic results of improper food, unsuitable clothing, and inattention, are writ in characters too large to escape consideration any longer, and already there is evidence that this phase of the subject will henceforth receive its due share of attention. But let us also be on the look-out for those influences which operate unnoticed at the base of the curve, producing no startling destruction, yet steadily and silently diverting a small but increasing share of the stream of our national life at its source. For example, in 1904 there were 772 deaths ascribed to "injuries at birth," quite an insignificant number out of the total of 137,000 infant deaths. A straw, however, will indicate the direction of the wind; and the significance of the above item is greatly increased when it is remarked that during the last twenty years the deaths ascribed to injury at birth have increased in number just twenty-fold, concurrently with a declining birth-rate. The Registrar-General gives the average annual death-rate from "injury at birth" (per million living) during the last four quinquennia as two, three, six, and nineteen respectively. This only needs to be carried forward a few generations to assume most alarming proportions. The deaths ascribed to "atelectasis" and to "congenital defects" are also uniformly increasing in number and relative significance, while "premature birth" as a cause of death shows a steady upward curve traced in far more imposing outlines. It is to the last named that I desire to draw special attention, but before doing so I would pause to emphasise the obvious relation of these minor components to the total infant mortality rates. Our total sacrifice of infant life is not relatively greater than it was half a century ago, but certain neglected ingredients of it are steadily increasing; hence the remainder must be decreasing, though, owing to considerations of mass, the effect is not prominent.

It may be said that these reflections open up moral and social questions with which this Conference is not concerned, and that we are not here to discuss the small number of children who arrive in this world "booked through" with little or no break of journey. But I want to suggest that the influences which are responsible for an increasing number of this type are also responsible for a greatly diminished number of the desirable type, and that the same influences are increasing the proportion of children who arrive unfitted for life's struggle, with the result that the problem of reducing our infant mortality is being rendered more and more difficult. It is a very important point to observe that the death-rate from "premature birth" did not begin to increase until the general birth-rate began to decline, and since then the two movements have been inversely proportional.

ENGLAND AND WALES.

Decade.	Average Annual Birth-rate per 1,000 living.	Ratio of Deaths under One Year per 1,000 Births.		
		(a) From all Causes.	(b) From Premature Birth.	(c) From Premature Birth, Congenital Defects, Injury at Birth, and Atelectasis.
1855 to 1864 .	34·6	154	11·0	?
1865 to 1874 .	35·4	155	11·9	?
1875 to 1884 .	34·7	144	13·7	?
1885 to 1894 .	31·2	145	16·8	20·5
1895 to 1904 .	29·0	150	19·8	25·2

We have few reliable records of the number of *still-births*, but from indirect evidence it seems clear that they also have increased, and, moreover, that the increase is now steadily going on. In the West

Riding administrative county (for those districts whose figures I have been able to get) the number of still-births per 1,000 live-births has been—

Year 1901	47·6
„ 1902	54·1
„ 1903	55·2
„ 1904	54·2
„ 1905	56·3

Apply these to the whole country (England and Wales), and it means that the number of still-births has grown from 44,270 in 1901 to 52,350 in 1905, an increase of over 18 per cent., while the total live-births have decreased in actual numbers.

Simultaneously with this movement there is good reason to believe that the ratio of abortions is growing. On this subject statistics are practically non-existent, but, in the opinion of many who are qualified to judge, an increase is undoubtedly going on. The registers which midwives are required to keep under the new Act are provided with a column for noting the number of previous labours and miscarriages which their patients have had. Of course the statement is merely the unchecked admission of the patients, and is more likely to be below the mark than above it. As far as I have been able to abstract the figures for 1904 and 1905 (covering nearly 4,000 confinements), there were forty-nine miscarriages to each 1,000 labours.

To sum up my observations, I want to suggest that we have a state of things which has, since about 1870, been tending increasingly in the direction of—

(1) relatively fewer conceptions;
(2) more abortions;
(3) more still-births;
(4) more deaths from "premature birth";
(5) an unknown number of those who only just escape 2, 3, and 4, and then quickly go to swell

the infantile mortality figures in spite of all possible sanitary improvements.

No. 5, though hypothetical, is, in my opinion, well indicated circumstantially, and my point is, that if we could for comparative purposes eliminate that group from our records, then our true infant death-rate would compare favourably with that of fifty years ago, as it ought surely to do as the result of the better hygienic and educational conditions of to-day. I am not prepared to believe that a child of given vitality, born even in these days of artificial feeding, has a less chance of survivance than had the child of similar vitality born in the "good old days."

The existence of group 5 does not necessarily spell deterioration of the race. Its members may indeed be evidences of the race's vitality, since they have survived the pre-natal obstacles which it is to be feared have been deliberately placed in their way. This is a subject which it is difficult to go into, but it is no use blaming our physical stamina or our methods of feeding and nursing for that which may be properly attributable to other causes, such as this. Many medical practitioners who are qualified to form an opinion have expressed their alarm at the general spread of Malthusian principles among the masses, and there is evidence that the use of abortifacients in our industrial centres is rapidly increasing.

If I have succeeded in showing that there is a deep and spreading connection between this subject and that for the consideration of which the present meeting is assembled, it is not necessary for me to point out that something should be done. The difficulty is when one is asked, What can be done? The first necessity is to get more precise statistical information than is at present available, and to this end the compulsory registration of still-births would be a step forward. This, it may be remarked, was one of the recommendations of the Inter-Departmental Committee on Physical Deterioration. Then we ought to have more precise national statistics as to the age and cause of death. The lowest age-group employed by the Registrar-General is 0—3 months, but if this could be very much subdivided in the future (and, if possible, for past years), we might obtain some light by comparing the numbers who succumb under one week and so on. In this respect the new Table 5 of the Local Government Board is a desirable advance. Another measure of good which might be carried out locally would be for the sanitary authority to institute a careful inquiry, through the Health Office, into all *deaths* of infants as they occur, with a view to compiling some information as to their life conditions and the causes of death beyond what is available from the death returns. Finally, some suitable means should be found, if possible, for inculcating, among the classes involved, a better appreciation of the sacredness of human life before birth. I suppose it is too much to propose the registration of abortions.

ALDERMAN B. TURNER (Batley) asked if it were not a fact that people in the West Riding could not afford to have the number of children mentioned by the author of the paper. Also, was it not the fact that owing to the introduction of machinery the stress and strain on life in the effort to earn a living constituted the great cause of infant mortality?

DR. SCURFIELD (Medical Officer of Health, Sheffield) confirmed by his experience in Sheffield what Dr. Kaye had said of the West Riding of Yorkshire. He did not wish to say anything which would form sensational news for the newspapers, and he hoped the Press would not take notice of his remarks, but it was absolutely the case that the sale of abortifacients in Sheffield went on broadcast. This was well known to the police, and the Home Office had no power to stop it. Several deaths of women occur in Sheffield every year through taking lead pills to procure abortion. Such large doses were taken that after the abortion the system had not sufficient recuperative power to recover. It was also known to the police that there were certain women in Sheffield who procure abortion; if they were unsuccessful in doing this instrumentally, they would tell the mothers that if they would send for them at their full time and not have a doctor, they would see that they did not have a living baby. He had reason to believe that a considerable number of babies were killed in Sheffield every year in that manner. He thought that something ought to be done to stop a state of affairs like that. The coroner was powerless in the matter, because these babies were sent to the cemetery as still births. That state of affairs fully justified anything that Dr. Kaye had said in regard to the registration of still-births. He thought a resolution might usefully go from that conference, but the less said about the subject in the newspapers the better. There might, however, be a resolution also with regard to the desirability of restraining the sale or use of abortifacients, and he would second such a resolution if Dr. Kaye would draw one up.

DR. M'CLEARY (Medical Officer of Health, Hampstead) wished to emphasise the importance of the registration of still-births. England was about the only civilised country in the world in which still-births were not registered. This seemed to him to be discreditable to a country which had been the pioneer in sanitary reform. The non-registration of still-births might be, as Dr. Scurfield had pointed out, not only a means of hiding crime, but it also tended to vitiate all infantile mortality statistics. Some time ago he had gone into the question of the increased mortality from premature birth, and found that there had been a great, an enormous increase, in the mortality from premature birth in the country as a whole, and in all the individual districts whose records he had been able to examine. In fact, he thought from an examination of the statistics that the increased mortality from premature birth was quite the most striking thing which could be observed in infantile mortality statistics for the last thirty years. The question had been put to him, without entering into every detail, whether that increase was real or only apparent. Might it not be due to the fact that a certain number of deaths which were formerly considered to be still-births, but which were really births of children who lived for a few hours, were now, owing to increasing carefulness of registration, set down as infants who had been born alive, but who had died from premature birth? If that be so, then the increased mortality from premature birth was not a real increase, but only an apparent increase, and that would account for the fact that the infantile mortality had not decreased as the general death-rate had done. That was the most important point to clear up, and a difficulty of that kind ought never to have arisen in a country which considered itself working on modern methods in regard to birth and death registration. He had endeavoured to get some information from the cemetery records, and was able to get figures from about a dozen London cemeteries as to the number of ordinary interments and of still-born interments for a period of about twenty years. The figures were not conclusive, but they did seem to show to him that the increased mortality from premature births was a real and not an apparent increase. What was the cause of that increase was naturally an important question. He could not say definitely, but he had his suspicions, and Dr. Scurfield had greater suspicions. But it was a point which should be cleared up quickly, for the increase was still going on. The mortality from premature birth last year was the highest on record, and called not only for a resolution of that conference, but also for national enquiry. But at all events, he hoped the resolution as to the registration of still-births would be carried unanimously.

THE MAYOR OF HUDDERSFIELD (Alderman B. Broadbent) thought that he was in a position to confirm what Dr. M'Cleary had said as to this country being far behind other countries in regard to this matter of the registration of still births. It had come into his way to make enquiries as to such registration in foreign countries, and he found that in all European countries still-births were required to be registered in the same way as live births. It seemed to be a grave defect in their work as to infant mortality that there should be no means whatever of knowing the number of these still-births. It had also come to his knowledge, from what had happened in Huddersfield, that there was a serious risk of children who had been born alive, and born apparently in a condition to live, being returned as still-births, because they had ceased to exist within a very few hours of having drawn their first breath. Therefore the registration of still-births seemed to be a very important measure indeed, and he hoped the resolution on the subject would be carried unanimously, so that we might know where we stood.

DR. CRAVEN said that he had not the slightest doubt that the statement made by Dr. M'Cleary that premature births were on the increase represented the fact. In some agricultural districts infantile mortality, apart from premature births, had all but disappeared. He suggested that the coroners of this country were partly responsible for the present state of affairs. There was not the slightest doubt that the coroner was legally entitled to hold an inquest on every dead body, no matter the cause of death certified by a medical practitioner or otherwise, even on a body said by a midwife or anybody else to have been still-born, for that child may have been put on one side wilfully. But the coroners could, if they would, take action under the Lord Chief Justice, who was the Chief Coroner of England. He had on several occasions noticed deaths certified as due to convulsions appearing in the weekly returns which had not been certified by any medical practitioner. On referring to the Registrar-General he was told that they did the best they could, but the best they could do was practically nothing, because the death was reported to the coroner by the registrar, and a country policeman would be sent down to make enquiries. That officer might be able to tell whether death was due to poison or violence, but he could not determine whether a child had been quietly hurried to its grave.

Dr. E. M. Smith (Medical Officer of York) said he was very glad Dr. Kaye had brought up this subject, in which he had been interested for some years. As a practical suggestion to his fellow medical officers of health, he thought that in their records of infant mortality and in the rate per thousand births they should give a separate rate for premature births, apart from the remainder of the deaths reckoned under the infant mortality rate. He thought that then there could be made a useful comparison year after year. The notification of still-births had become, in his experience, an increasing necessity since the passing of the Midwives Acts. Midwives were now possessed with the idea that they were medical practitioners and capable of certifying almost any death that occurred within their practice, even when a medical man was not in attendance. There was, therefore, this special danger in connection with premature births, because the midwives believed that they could certify them, and, as had been suggested by Dr. Scurfield, there was great suspicion, or at any rate great reason to believe, that numbers of bodies of dead children were sent down for burial which had actually lived, although prematurely born—sent for burial as still-births. Another thing he would like to suggest, not because York was a bad example, but because he knew that many towns had great difficulties in this respect, that not only should still-births be registered, but that no deaths should be registered as uncertified. Every death which occurred without a medical man being in attendance should go to the coroner, and there should be no power in the sub-registrar to enter a death as uncertified. He considered that uncertified deaths were a disgrace to our registration system, and he was always proud of the fact that York stood very well in its percentage of uncertified deaths. Another good rule would be that no body of a child dying with six months of pregnancy should be buried without a medical certificate or a coroner's certificate. That was a vital point which he would like added to the resolution.

Dr. A. K. Chalmers (Medical Officer of Health, Glasgow) thought that if the statement that the proportion of premature deaths is increasing were accepted, they would have to undo much that the Departmental Committee of Physical Deterioration had done for us in saying that there was no such thing as physical deterioration affecting the race. With regard to the opinions which had been expressed, he thought it was rather the case that during all the months of infant life there had been a decrease in the relative number of deaths save in the first three months; and that while it is perfectly true that the majority of deaths in the first three months are due to immaturity, in his opinion it was rather overstating the fact to say that the rate from it has increased. The proportion was increasing because the other rates were shrinking.

Dr. Niven (Medical Officer of Health, Manchester) informed the conference that in Manchester, with regard to the registration of still-births under the administration of the Midwives Act, they obtained from the registrar of the cemeteries a list of all the still-births for the purpose of controlling the notifications from midwives. He did not suggest that that met the difficulty which had been raised in the course of the discussion; he did not think it did, but Dr. Smith's point was the crucial one, that there should be a medical certificate in every case. That seemed to him to be the point to insist upon more particularly.

In reply to several questions,

Dr. Niven further explained that the information was obtained from the registrars of the cemeteries in accordance with a resolution passed by the Parks and Cemeteries Committee of the Manchester Corporation. The information was supplied for the purpose of administering the Midwives Act, and it was not paid for. Nearly all the Manchester cemeteries were owned by the corporation, but the information was obtained voluntarily from those cemeteries which were not so owned.

Dr. Halliwell (Dewsbury), referring to the remark of several speakers that there was considerable danger of children who had lived being certified as still-born, said that he would go so far as to say that there was more than a danger: it had been an actual fact. A few years ago he was in practice in a country district in the south-west of England, and certified the death of a child who had only lived a few hours. This was done in the usual way. A day or two after he met the sexton, who said, "In case you have any deaths of a similar nature where the child is only young you need not bother to send in a certificate." Asked why, the sexton replied, "It is not worth while, we do not trouble about it here." Asked how long a child might live and he would accept it as still-born, the sexton said, "Oh, we will bury it if it has lived two or three days; it's all right." That was proof of what had been advanced that afternoon. That sexton was now himself dead.

Dr. Heywood said that in the town he represented the average number of still-born children buried in the cemetery with only an old woman's certificate averaged sixty per annum. That was out of a population of 40,000. Over those sixty deaths there was no control, and he knew personally that some of those children had lived and breathed for several hours. If that was not sufficient justification of the resolution he did not know what would be sufficient. He would like to emphasise what Dr. Smith had said in regard to the uncertified cases, which were accepted by the sub-registrar, and the cause of death put down to convulsions. In such cases the coroner ought certainly to hold an enquiry.

Dr. J. R. Kaye (West Riding of Yorkshire), in reply to the suggestion that they could not afford to keep large families in the West Riding, said that he knew a good many families there, and if the mothers were asked if they would spare one out of half-a-dozen children, the answer was that not one could be spared. As to the introduction of machinery being a contributory cause to mortality, that was no answer, because, as Mr. John Burns had so well said, there ought not to be any women engaged in factory labour during pregnancy. With regard to still-births, he had 1,088 midwives to deal with, and naturally there was a great variety among them. The idea often prevailed that a still-birth was not a body at all, and that the midwives could do what they liked with it, put it at the back of the fire or bury it in the garden. With regard to undertakers, he hoped he would not shock the public, but he knew for a positive fact that some undertakers would hoard still-births up at the back of their shop, and when a death came along would stuff them into the coffin, screw it down, and nobody knew anything about it. Therefore no adequate idea could be obtained from the cemetery as to the number of still-births. He was delighted that his paper should have given rise to so much useful discussion, and said that the point he wished to bring out most was not to deal so much with superficial causes, food, clothing, and bad seasons, but to urge that in the future we must have more regard to the physiological factors which are keeping up the rate of infant mortality.

The Chairman said that a resolution was being prepared and would be submitted to the conference on the following day in connection with the Mayor of Huddersfield's paper on "Earlier Registration or Notification of Births." As there was a strong feeling on the matter, it was as well that the resolution should be carefully drawn.

ALCOHOLISM IN RELATION TO INFANTILE MORTALITY.

By Professor G. SIMS WOODHEAD, M.A., M.D.

Fellow of Trinity Hall, Cambridge.

The relation of alcoholism to infantile mortality has so many aspects from which it may be viewed, that one is almost afraid to enumerate them lest those who have not studied the question carefully may gather the impression that one is attempting to exaggerate the importance of the factor of alcoholism in this connection.

In the first place it must be accepted that alcohol, even in comparatively weak solution, plays a far more important part in determining malnutrition of the tissues than was at one time recognised. That alcohol or its "degradation products" have a direct poisonous action upon protoplasm of all kinds, but especially upon delicate embryonic protoplasm, there can be little doubt. This assertion is sometimes met by the statement, and a perfectly true statement, that the less highly developed the protoplasm the greater is the amount of alcohol required to arrest its activity, that is, to paralyse it. For example, the functional activity of the brain is apparently far more readily paralysed or thrown out of gear than is the functional activity of the connective tissue, but in considering the general question it must be remembered that the highest functional activity of any cell is always that which is most rapidly and readily interfered with. In the case of the brain cell we have paralysis of the special functions associated with that cell—the reception, association, or initiation of nervous impulses. The brain cell has little or no power of proliferation, nor is its metabolic activity so great, relatively, as is that of the growing embryonic tissues in which proliferation and the function of nutrition of the embryonic cells may be looked upon as constituting the highest functions. From this we should gather that as it is the highest activity that is first affected by noxious agents, the proliferative and high metabolic activity must be first interfered with in the cells of the embryo, with the result that during this active metabolic period development and growth must be specially checked by the action of such agents. We have now at our disposal a series of experiments which may be looked upon as classical —they have been corroborated so definitely and quoted so frequently—from which we may gather that alcohol either in the form of a weak watery solution or of a vapour, arrests the development, and interferes with the proper growth of the eggs of organisms so wide apart in the scale of animal life as are blow-flies, the frog and the hen. In all these experiments it has been found that if the alcohol acts for a comparatively short period of time only, the solution must be somewhat stronger than if the developing organism be exposed to the action of alcohol for a longer period, a fact that must be borne in mind in the weighing up of all such experiments.

If a study of the physiology of gestation has made clear any single point in connection with nutrition, it is that the development of the child *in utero* depends very greatly upon the healthy performance of the functions concerned in the nutrition of the mother. A diminished or excessive amount of food or any interference with the action of the excretory functions in the body, as a result of which we have an accumulation of waste material in the tissues, interferes more or less markedly with the development of the child. This is understood readily enough when it is remembered that the mother has to obtain and utilise nutriment, not only for the building up of her own tissue, a process which goes on comparatively slowly, but also for the rapid development and growth of her unborn child. Moreover, with this increased consumption of nutrient material there is necessarily a greater strain thrown upon the excretory organs, and unless the increased demand, both for nutrition and for excretion are met, both mother and child must suffer. It is now placed almost beyond cavil that alcohol even taken by a healthy man engaged in active exercise in the open air exerts a definite influence in paralysing or lowering the activity of the cells as regards their power of taking up nutriment. Even those who claim that alcohol acts beneficially maintain that excessive waste is prevented through a slowing down of the metabolic processes. Alcohol acting upon the cells undoubtedly impairs their power of getting rid of waste material. As this interference comes in, then, at every stage of the process, both of nutrition and excretion, we can see that even a slight interference with an individual tissue, when cumulative, owing to the larger number of tissues concerned in the taking up of food material and the throwing out of waste material being involved, comes to be a very serious matter indeed.

All this taking place in healthy men may give rise to slight lethargy only, or indifference to work, but in the case of the mother on whom so much extra work is thrown, and of the child with its delicate growing tissues, both of which require such an enormous amount of nutritive material and have to get rid of such a great quantity of waste products, the evil effects are much more marked. One would expect, *à priori* that a child starting out handicapped by these unfavourable conditions would have far less chance of living a healthy life of normal duration than has the ordinary child; and I believe that every medical man who has attended a large number of confinements in districts in which drink is, if one may put it in that way, endemic, will be able to call to mind evidence that the children of a drunken mother have almost without exception been poor, wretched little weaklings that bring into the world with them little chance of living the allotted span of life. Further they will have found, as have most of those who have paid attention to this matter, that the longer the mother has continued to drink the more certainty has there been that the child has come into the world badly nourished and less able to cope with those ailments and conditions so fatal to the child of tender years. It is difficult to get statistics on this and other similar points, but I should like to suggest to this conference that difficult as the matter appears to be some attempt should be made to bring together some such statistics, or an extension of them, as those on which Professor Bunge is now engaged, and I venture to place before you a copy of a form in which he wishes to have certain information entered. If nothing else were to come out of this conference than a systematic attempt to obtain such information, I believe its organisers would be more than justified in their work.

MRS. X. Y.

1. *Number of children:*
2. *How many were nursed by Mrs. X. Y., and how long?*[1]
3. *Causes of non-lactation:* (Causes should be stated also, when lactation was stopped before the end of the ninth month.)
   (*a*) not *wanting* to nurse:
   (*b*) not *being able* to nurse:
      (α) on account of insufficient secretion?[2]
      (β) ,, ,, ,, depressed nipples?
      (γ) ,, ,, ,, some other unsuitable condition of the nipples?
      (δ) ,, ,, ,, any other reasons?
4. How many children had the *mother of Mrs. X. Y.?* How many did she nurse herself? How long? How many did she *want* to nurse? How many *could* she not nurse? For what reasons?

   How many brothers and sisters had Mrs. X. Y.? Where did she come in the list?
5. Hereditary diseases of Mrs. X. Y. herself, of her parents, brothers and sisters, and of the family in general, especially *Tuberculosis*, *Nervous Complaints*, *Mental Disturbances*, *Gout*, *Cancer*, *Diabetes*. If *none* of these diseases are present, it should be specially noted.
   (*a*) Hereditary diseases of Mrs. X. Y. herself.

   (*b*) Hereditary diseases of the father of Mrs. X. Y.

   (*c*) Hereditary diseases of the mother of Mrs. X. Y.

   (*d*) Hereditary diseases of the brothers and sisters of Mrs. X. Y.

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[1] If the children were nourished in different ways, arrange them according to age, and state in each case how the child was nourished.

[2] State those cases in which the mother nursed the child, but where this nourishment was insufficient and artificial feeding had to be added.

In cases where reliable information on any one of the above-named members of family cannot be procured the fact should be specially stated.

6. Condition of the teeth. How many teeth are wanting? (State the exact number.)
   How many are carious? (State the exact number.)
   State the *age* of Mrs. X. Y. at the time of examination of the condition of the teeth.
7. Quantity of alcohol consumed by Mrs. X. Y. herself and by her parents respectively. State whether alcoholic beverages were taken *regularly*, about how much, and whether larger quantities were often taken besides the regular quantities.
   (*a*) Quantity of alcohol taken by Mrs. X. Y. up to the birth of the last child.

   (*b*) Quantity of alcohol taken by the father of Mrs. X. Y. up to the generation of the daughter X. Y.

   (*c*) Quantity of alcohol taken by the mother of Mrs. X. Y. up to the birth of the daughter X. Y.

   If no reliable information can be obtained concerning the consumption of alcohol by one of these three members of the family, it should be specially noted.

8. Nationality, Race (Germanic, Scandinavian, French, Italian, Semitic, etc.).

Signature of the Physician :

It is constantly being pointed out that although there has been such a marked fall in the general death rate (and in some cities, Glasgow, for example, the death rate has fallen by one-half during the last thirty or thirty-five years) the infant mortality does not show a corresponding fall. One reason for this is, no doubt, that nowadays mothers don't nurse their children. Now, the failure to do this depends, both directly and indirectly, to some extent on the alcohol factor. Professor Bunge ("Die zunehmende Unfähigkeit der Frauen ihre Kinder zu stillen"), using the above forms, has collected some very interesting information and statistics concerning the influence of alcoholism in determining the incapacity of women to suckle their children. He, finding it very difficult to come across many "total abstainers" in Germany, divides his people into four categories, in the first of which the members do not take alcohol daily, and when they do take it at all take it in small quantities only. He thinks that in connection with this category more reliable statistics might be obtained in England where the number of what are called "pledged" abstainers is comparatively high. Under his second category he includes regular and moderate drinkers, using the term "moderate" as including those who daily consume less than two litres of beer, or one litre of wine, or a corresponding amount of other alcoholic liquors. Under the third category come those who, daily, take a larger quantity than this, but can scarcely be called drunkards; and finally a category in which are included all drunkards. The families he divides into three groups. In the first of these are included those in which both mother and daughter are able to suckle their children; in this group are included 422 cases. In the second group the mother is able to suckle her child, but this power has not been handed on to the daughters; here there are 281 cases. In the third group neither mother nor daughter was able to suckle her child—435 cases.

Bunge considers that most information is to be acquired as to the casual connection between alcoholism and inherited lack of power to suckle from a careful study of the second group. Here, although the mother has this power the daughter has not had it handed on to her. Bunge believes that the cause of this inherited abnormality must be looked for in the father. This hypothesis he finds is supported by the fact that in 42 per cent. of all this class of cases the father is reported to be a notorious drunkard, and in 36 per cent. of them he is said to be an "immoderate" drinker; so that in nearly four-fifths of all these cases the immoderate use of alcohol on the part of the father appears to interfere very seriously with the development and function of some of the most active glands in the daughter. As additional proof of this hypothesis it is pointed out that in the first group, where both mother and daughter are able to suckle their children, the drink habit in the father is seldom in evidence; in only nine out of 346 cases was this drink habit proved, or in less than 3 per cent. of the whole, and he makes the statement that "where the father is a drinker the daughter loses the power of suckling her child; moreover this power is lost for coming generations. This loss of power to suckle is no isolated phenomenon. It is coupled with other symptoms of degeneration, especially with the absence of resisting power against diseases of all kinds, tuberculosis (see p. 36), nerve disease, and caries of the teeth. The children were insufficiently nourished, and thus the deterioration increases from generation to generation." The accompanying table gives the details of these observations.

GROUP I.—MOTHER AND DAUGHTER BOTH ABLE TO SUCKLE THEIR CHILDREN, 422 CASES. EXACT INFORMATION AS TO ALCOHOL CONSUMED BY DAUGHTER CONTAINED IN 386 CASES, BY MOTHER IN 369, AND BY FATHER IN 346 CASES.

	Daughter.	Mother.	Father.
	Per cent.	Per cent.	Per cent.
Not regular consumers	69·9	75·3	52·3
Regular but moderate consumers	28·8	23·6	38·2
Regular and not very moderate consumers	0·8	0·8	6·9
Drunkards	0·5	0·3	2·6

GROUP II.—MOTHER ABLE, BUT THE DAUGHTER UNABLE, TO SUCKLE BABES, 281 CASES. ACCURATE INFORMATION AS TO ALCOHOL CONSUMED BY DAUGHTER IN 228 CASES, BY MOTHER IN 210, AND BY FATHER IN 199 CASES.

	Daughter.	Mother.	Father.
	Per cent.	Per cent.	Per cent.
Not regular consumers	49·6	56·7	11·1
Regular but moderate consumers	45·2	40·5	11·1
Regular and not very moderate consumers	4·4	1·9	35·7
Drunkards	0·9	1·0	42·2

GROUP III.—MOTHER AND DAUGHTER BOTH UNABLE TO SUCKLE THEIR CHILDREN, 435 CASES. EXACT INFORMATION AS TO CONSUMPTION OF ALCOHOL BY DAUGHTER IN 222 CASES, BY MOTHER IN 203, AND BY FATHER IN 199 CASES.

	Daughter.	Mother.	Father.
	Per cent.	Per cent.	Per cent.
Not regular consumers	39·2	32·5	13·1
Regular but moderate consumers	57·2	64·0	56·3
Regular and not very moderate consumers	2·7	1·0	11·6
Drunkards	0·9	2·5	19·1

The influence of an alcoholised father is great in interfering with the development of an important organ, and probably, therefore, in determining a general deterioration; but the alcoholic mother is, as we have already suggested, a still more important factor in the deterioration of the individual and the dying out of the race. Bearing on this point The Rt. Hon. John Burns, M.P., in his Lees and Raper Memorial Lecture, makes the following statement: "Whatever doubts there may be in regard to the physical degeneration of the race, there is none as to the diminishing birth-rate in this country; and while there are many causes leading to this, the increasing amount of alcohol drunk by women, and the more selfish lives they lead, are responsible for many sterile marriages." In support of this he brings forward the evidence of Dr. Lonnet, to the effect that "in Brittany, of 107 women who died from the consequences of alcoholism, before reaching the age of twenty-nine, eight had not had any children. Of the other ninety-nine there were born only six children, and these were delicate or deformed. These same women, before becoming addicted to alcohol, had had twenty-eight children, all of whom were healthy and vigorous." This accords, of course, with our experience in this country, for it will be found that although amongst the poor generally the birth-rate is high, amongst the drinking poor the birth-rate is low, especially during the later years of what should be the child-bearing period. Here again it is difficult to get accurate statistics, in fact there appear to be none such in existence, but it will be well worth our while to attempt to devise some organisation for their collection.

We now come to the less direct effect of alcoholism on the individual, and therefore on the race. Owing to the poverty induced by drink many wives and mothers find that it is impossible to keep the house "going" unless they do some work, either outside or within the home—work for which they may be paid a few shillings a week only, a sum large enough, however, to make the difference between having insufficient bread, and bread enough, for the children. Unfortunately, in many of our large towns this necessity to work has led in certain cases to the wife copying the husband, only too faithfully, in the matter of alcoholic excess, and, as already stated, this involves an impairment of nutrition which, though important enough to the wage-earner, is far more important in the case of the mother, in so far that impaired nutrition in her case tells in much higher degree on the unborn child. The malnutrition during the early stages of its development is so marked that the child when born can have anticipated for it a period of existence, ten, twenty, thirty, or even more years shorter than the life to which it is normally entitled. Moreover, even should the mother afterwards suckle her babe, she is often so badly nourished, either from want of food, or as the result of poisoning of her tissues by alcohol, that both character and amount of nourishment suffer, and with them the child.

In certain cases in which the mother cannot nurse the child it suffers because she is unable to obtain proper food for it; in others, the mother drinking to excess makes no effort to obtain such proper food even when sufficient funds are available, and irreparable damage to the child is the consequence. Again, it suffers both directly and indirectly, and where the margin of life is already so narrow the cutting off of very little means rapid degeneration and early death.

Pathologists have for long been preaching from the text that animals treated with alcohol are much more susceptible to infection by the tubercle bacillus and by other disease-producing organisms than are animals not so treated. The application has been made that the adult who takes alcohol is more susceptible to the attacks of various infective diseases, tuberculosis amongst the rest, than are those who do not take alcohol. Now if this holds good in the case of adults, —and there appears to be little reason to doubt the accuracy either of the observations or of the inferences drawn therefrom,—the child of an alcoholic mother must come into the world with an enormously diminished immunity to disease (cf. quotation from Bunge, p. 35). Now tuberculosis and diphtheria are two of the common diseases of early infantile life, and between one and five years of age these two diseases are accountable for many of the deaths that take place amongst children. During the first year of life diphtheria is exceptionally fatal. If we include measles and scarlet fever and the pneumonias that are associated with or follow these diseases, we find that a very large proportion of infantile diseases are the results of the activity of infective organisms, and it cannot but be recognised that the child deprived of an immunity which should be transmitted from its parents (*i.e.* the child has its tissues deprived of their power of resistance as the result of the action of alcohol on the mother) runs a much greater risk of contracting early and fatal disease than does the child in which this immunity or tissue resistance is higher because of the more perfect nutrition and lack of interference with the tissues by the action of alcohol.

I must not now go into the whole question of nutrition, and I think that I have said enough to indicate the lines on which I think this discussion might proceed. I may, however, before I close, be allowed to call attention to two very remarkable statements. The first of these was made by my friend, Dr. Charles Templeman, and is quoted by Mr. John Burns: "There can be no doubt," he says, "that drunkenness on the part of parents is a very important factor in the production of our infant mortality. Apart from the effect of this on the child *in utero*, there is another aspect to which I could allude, viz.: deaths from overlaying. These cases occur, as a rule, in one and two-roomed houses, and in a large majority of cases, in families in which the parents are of dissipated and dissolute habits, and living amidst squalor and filth. Of 461 cases which have come under my observation, as surgeon of police, during the past twenty years, no fewer than 219, or 47 per cent., occurred between Saturday night and Sunday morning, a fact which speaks for itself." And what is here recorded is simply a counterpart of what is going on in Liverpool, Birmingham, London, or any of our large cities, and, in a less degree, perhaps, in every part of the country.

Those of you who have read the report of the Interdepartmental Committee on Physical Deterioration, cannot but be struck by the part that alcohol is considered to play in determining the spread of disease through gross vice. It must be remembered that syphilis is the genius of sterility and of infantile mortality, so that alcohol, in the part that it plays in determining a loss of self-restraint and in increasing immorality, helps indirectly in the production of a higher infant mortality and a lower birth-rate. Here I refer to the second statement I have mentioned, and with this I will close. Mr. Burns, in his excellent Lees Raper address, argues that alcoholism, not the result of poverty, may be accountable for deterioration of the race and a consequent rise of infant mortality. He says, "A mere increase of material prosperity generates as many evils as it destroys. It may diminish offences against property, but it augments offences against the person, and multiplies drunkenness to an alarming extent. Whilst it is an undoubted fact that material wretchedness has a debasing effect both morally and physically, it is also equally true that the same results are sometimes found to flow from an increase of economic well-being. An interesting proof of this is to be found in the recent investigations of M. Chopinet, a French military surgeon, respecting the status, etc., of the population in the Central Pyrenees. M. Chopinet, after a careful examination of the conscript registers from 1873 to 1888, arrives at certain conclusions as to what determines the physical condition of the population. After discussing the commercial influence and the evil effects of poverty and bad hygienic arrangements for the people, he points out that moral corruption arising from material prosperity is also a powerful factor in producing physical degeneracy. He singles out one canton—Luchon—as being the victim of its own prosperity. In this canton, he says that the old simplicity of life has departed in consequence of its prodigious prosperity. Vices formerly unknown have penetrated into the country, the frequenting of public-houses and the habit of keeping late hours has taken the place of the open-air sports which used to be the favoured method of enjoyment; illegitimate births, formerly very rare, have multiplied; syphilis has spread even among the young; food of a less substantial character has superseded the diet of former times; and, in short, alcoholism, precocious debauchery, and syphilis, have come, like so many plagues, to arrest the development of the youth, and seriously debilitate the population." There again, "the evil arises from not lack of means, not the niggardliness of nature, nor the inhumanity of man, but the danger that a fool is to himself, when his purse is full, his tastes disordered, and he has, as Ibsen says, 'vine-leaves in his hair.'"

ANTE-NATAL CAUSES OF INFANTILE MORTALITY, INCLUDING PARENTAL ALCOHOLISM.

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Birth, Not the Beginning of Life.

Birth is not the beginning of life for any one of us; we were all alive for some months biologically, if not legally, before we were born. During these months, uncounted in the tale of the days of the years of our lives, we developed from an apparently simple speck of matter into an organism so complex and with potentialities so far-reaching as to defy description and estimation; we were nourished by a placental mechanism so intricate that physiologists are puzzled to explain it, and generally refer very little to it; we grew at a rate which must be called extraordinary when we remember that in one month (the fourth of ante-natal life) we quadrupled our weight; we breathed albeit not with lungs, for we were in a hydrosphere not an atmosphere; our hearts beat continuously and evenly, but at double the rate they do now; and we moved freely, automatically and reflexly, not voluntarily, for our wills were not yet in action. At birth, a new environment began to modify the performance of all these activities; but, although modified, the manifestations of life and growth continued to show themselves in nutrition and respiration and circulation and nervous action, and the like, as they had done in ante-natal existence. Birth, then, marked not an origin or beginning, but a stage in life's progress; to be exact, it indicated the beginning of a stage, that of post-natal or independent existence.

Dante's View of Ante-Natal Life.

This is no new view of life, indeed, it is a very old one. When Dante, in the beginning of the fourteenth century, looked out on the world with those far-seeing eyes of his, he failed not to notice that the life of man was an arch with its apex at the thirty-fifth year; for thirty-five years man climbs upward, for thirty-five more he passes slowly downward, reaching at length the Psalmist's limit of three score-years and ten. But Dante noted also the occasional prolongation of man's years to four score, and believed that in perfect lives the limit of eighty years ought always to be reached. This period of ten additional years he named "decrepitude," and he explained its occurrence by a reference to the pre-natal life, calculated by him as lasting for eight months before birth (*Convivio*, IV., XXIV. 44). He thought that the presence of this epoch of pre-natal existence required a like period at the other end of life to balance it and to complete the symmetry of the whole. The epoch of decrepitude, however, he made ten years, while that of ante-natal life was only eight months; and the quaint reason is to be found in the words "inasmuch as our nature is eager to rise and hangs back from descending." The recognition, then, of the presence and importance of our ante-natal or pre-natal life is not new, it is very old; but it has been in recent years somewhat overlooked. There have been several reasons for this neglect; but I shall allude here to one only.

The Development of Preventive Medicine.

The discovery of the microbic, toxic, and parasitic causes of disease has had far-reaching effects; it has made it possible for the public health authorities to check epidemics, to diminish the death rate from the exanthemata, and to make Dante's ten ultimate years of life more than ever a possibility for all of us; it has enabled the surgeon to operate with safety upon conditions which would otherwise have been beyond his control; and it has removed from the process of childbirth and from the early months of life many of the dangers with which they were surrounded. The success of preventive medicine has focussed attention upon the causes of disease, or rather upon the active causes of disease, as they can be seen at work during man's progress from the cradle to the grave; and the fact that all these causes may be in action before birth has been rather overlooked. Another fact has been overlooked—that all individuals are not equally susceptible to the evil effects of the microbic, toxinic, or toxic causes of disease; that the seed sowed does not grow with the same readiness in all soils; that in some persons at some periods in their lives there is a stronger resistance offered to the influence of morbific agencies than in others or at other times. To complete the beneficent action of preventive medicine we require ante-natal prevention, and in the cases in which it is absolutely impossible to exclude or destroy the causes of disease, we must direct our energies towards strengthening the resisting powers of the individual.

The Perfecting of Preventive Medicine.

To obtain the greatest benefits from preventive medicine, we must begin the prevention with the beginning of life: in other words, we must try to protect the as yet unborn infant. That it is possible to some extent to shield the infant from harm during the nine months which precede birth I hope to show in the paragraphs which follow. It may also be possible to influence the health of the offspring still further back in time; but this consideration would lead me into the subject of heredity, and with that matter I do not at present intend to deal. I draw a clear line, in theory, between the influence a mother has upon the health of her infant while he is in her womb during the nine months of her pregnancy, and that other influence, which we call heredity, which both parents, and both their parents, and so on, have exercised upon their descendants during the long progress of the silent years of the past. In considering the factors which make up a mother's influence on her unborn infant we are dealing with matters which can be recognised and discussed practically—for instance, a mother takes small-pox during her pregnancy and gives birth to an infant marked with small-pox pustules or with their scars, and the conclusion is irresistible that she has transmitted the disease. On the other hand, the consideration of the factors which make up heredity in the human subject leads us into labyrinths of conjecture and theory—for instance, a woman, who is herself apparently healthy but who has a father suffering from the bleeding diathesis or hæmophilia, gives birth to a male infant who is afflicted with his grandfather's malady, and we say that she has transmitted to her child this disease in a hereditary fashion, but we have the greatest difficulty even in theory in explaining how the transference has occurred. It may yet be discovered that hereditary transmission is nothing more than a more subtle and more distant mode of germ infection, and it may be possible by preventing the marriage of the unfit and encouraging that of the fit to reduce hereditary maladies and weaknesses below the level where we now find them; but these things are at present beyond our reach, and we must content ourselves with the more practicable propositions which cluster round the care of the pregnant woman for the sake of her unborn infant.

I leave out of account, therefore, problems of heredity, because I do not regard them as solved to such an extent as to come within the range of the practicable. I also omit from consideration here the well-known methods of reducing the death rate among infants after birth by means which come into action after birth. These means are known to all, and if applied by all will undoubtedly do much to diminish the distressingly high infantile mortality which prevails all over the world. For instance, the proper feeding of young infants, the spreading of a knowledge of the hygiene of infancy, the regulation of infant life assurance, the raising of the standard of the health of family life among the working classes, the deepening of the feeling of the responsibility of caring for young lives among all classes—these and the like will not fail to do much to remove the high mortality that all right-thinking persons deplore. I wish here to draw attention rather to the means which lie between the obviously practicable measures of diet, hygiene, and management of infants and the (to my mind) as yet impracticable theories of the prevention of hereditary tendencies; in a word, I wish to deal with the influencing of the unborn infant during the seven or eight months which precede his birth when his life is so intimately bound up with that of his mother. It may be said that this is nothing more than the carrying out of the rules of hygiene in the case of the pregnant woman, for it is only through influencing her that we can influence her infant, and I am quite content that this be said so long as that be done. But, as I hope to show, it will be more easy to carry out the hygiene of pregnancy, if the laws of the inter-relation of the lives of mother and unborn infant are better understood, and for this reason the following considerations will not be without value.

The Ante-Natal Economy.

From the second or third month of ante-natal life up to the full term when the supervention of labour is to be expected, there is practically no alteration in the relationship in which the fœtus in the uterus stands to the system of the mother. Before the end of the second month after conception the relationship is quite different, and I wish at present to exclude it from this discussion; but from the third month onwards the unborn infant is brought into relationship with his mother by means of the placenta, and to this state of affairs the name placental economy may be appropriately given. Let me, as briefly and as simply as possible, indicate the chief characters which distinguish this economy.

The fœtus in the uterus is surrounded immediately by a liquid with a specific gravity a little greater than that of water, and with a composition which shows a decreasing amount of albumin, mucin, and extractive matters as the pregnancy advances; this liquid is the amniotic fluid, and it forms what I have termed the hydrosphere, in which the unborn infant moves. It serves to maintain an even temperature round the fœtus, to shield it from injuries which the mother may receive, to permit of free movements of the unborn infant, and to serve as a supply of water, and perhaps, to a small extent, of proteids, etc., to the fœtus. It is germ-free in normal circumstances, and it probably modifies the course and characters of fœtal diseases and expedites the healing of fœtal wounds, etc.

Around the liquor amnii are the fœtal membranes, the amnion and chorion. These membranes play an important part in the earlier stages of ante-natal life, and the chorion has much to do with the formation of the placenta; but in the later portion of pre-natal existence their functions are ill-defined, and cases have occurred in which the amnion has ruptured and the fœtus has grown quite well outside of it. Possibly, in a few cases, the microbes of diseases or toxic substances may pass from the mother's blood through the membranes to the liquor amnii, and so reach the infant; there may even be a physiological circulation of water, etc., from the mother's blood into the amniotic fluid and back again.

Where, however, the vascularised part of the chorion comes into contact with the part of the mucous membrane known as the decidua serotina, there the important structure, called the placenta, develops. In this organ the blood of the mother and that of the fœtus do not indeed mix, but they come into such close relations with each other that fluids, gases, and to some extent solids (*e.g.*, white blood corpuscles) can pass over from the one to the other. It is a spongy structure, in which the finger-like projections of the fœtal chorion, containing blood-vessels with fœtal blood in them, hang free in pools of maternal blood; and it forms the great connecting link between the mother and her unborn infant. So important is the part it plays in the ante-natal economy, that it deserves a paragraph to itself; for it is not simply a filter, as is sometimes supposed, but also the most vital organ that the fœtus has.

THE PLACENTAL FACTOR IN THE ANTE-NATAL ECONOMY.

The placenta has several functions, that of a filter being doubtless the best known. Through it certain things pass from the mother to the fœtus; certain other things, such as microbes and some metallic poisons, do not pass. It has, therefore, the mode of action of a filter. But it is not an ordinary filter in the mechanical sense of the word; it is a vital filter. In other words, it allows things to pass at one time and not at another, and it would appear to have the power of modifying substances in transit. It is, to some extent, a discriminating and a digesting filter. It is protective also, for there is evidence to show that it generally succeeds in keeping back, and so saving the fœtus from some poisons and most, if not all, pathogenic organisms. More than this, it allows a reverse current to traverse its tissues, for substances pass from the fœtus to the mother, some apparently constantly, others occasionally. The growth and health of the fœtus, then, depend largely upon the normal action of the placenta, and to some extent the health of the mother depends upon that of the fœtus, as revealed by changes in the amount or character of the substances passing from the latter to the former.

Many illustrative instances might be given of this filtering action of the placenta, and many such are given in my work on *Ante-Natal Pathology* (Vol. I.[1]); but here it will be necessary to mention only a few. In order that the fœtal tissues, such as bone, muscle, and blood may be developed in utero, the elements that make up these tissues must be transmitted by the placenta from the mother's blood to that of her fœtus; but it does not follow that the elements pass in the same chemical combinations as those in which they are afterwards found in the fœtus. In other words, phosphate of lime may not pass in that form, but the phosphorus may pass in one combination and the lime in another; indeed, there is evidence that this happens, and also that the phosphorus passes over first and is joined by the lime at a later date in pregnancy. There is some evidence that white blood corpuscles pass from mother to fœtus but there is none that red corpuscles do so. In the later months potash passes much more freely than in the early months; and in the last three months there is a storing up of iron in the fœtus at the expense of the maternal reserve of that metal. These conclusions are founded upon the chemical analysis of dead fœtuses of different ages in ante-natal life.

Other instances of the filtering power of the placenta are found in the fact that in some cases the mother may be affected with tubercle in an advanced stage of development, and yet the foetus be found to be free from tubercle bacilli. Again, in cases of poisoning with certain minerals, no traces of the toxic substances may be found in the foetus. Yet again, in cases of vaccination of pregnant women, it does not always follow that the infants will be immune to small-pox and vaccinia when born, but in a certain proportion of cases they are.

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[1] To avoid frequent reference to this work, I may say that any who may be interested in the subject will find references therein to evidence in support of my conclusions stated in this paper.

There is neither time nor space to refer to the other functions of the placenta, such as digestion, blood-formation, the protective storing up of poisons in its substance as does the liver, the formation of an internal secretion, and the like; but as they do not immediately affect my conclusions they may be omitted. I hasten to refer to disordered action of the placenta, to the breaking down of the placental barriers against disease, to the failure of the filter.

The Failure of the Filter.

There is abundant evidence to show that the placenta does not always succeed in playing its beneficent protective *rôle*; in some way or other the barriers are broken down and germs, toxines, toxic substances, and sometimes antitoxines, agglutinins, and hæmolysins flow across into the fœtus. When this happens various effects may be produced: the fœtus may die at once from the action of the poison; it may develop the disease in a form differing from what is found in the mother, the difference being probably largely due to the peculiarities of the ante-natal environment and to the special physiological mode of action of the fœtal organs; the pregnancy may be brought to an end in abortion, probably caused in most cases by the evil effects the poison has on the decidual membranes rather than by any direct influence on the early fœtus; or, at later stages in pregnancy, the gestation may be brought to a close prematurely and the infant develop the disease after birth and die from it or recover from it. There is evidence that the passage of the germs or poison from the mother to her unborn infant is not always attended by fatal consequences to the latter; in some remarkable cases of maternal small-pox and typhoid it would appear that the infant has suffered from these maladies in utero concurrently with the mother and has made a very complete and satisfactory recovery from them ante-natally. This need cause no surprise when we recollect what the intra-uterine environment is and how well adapted it is for the treatment of such a disease as small-pox. Even when the filter fails, therefore, there are natural means of saving the life of the fœtus and bringing it back to complete or partial ante-natal health. At the same time, while this is so, it must never be lost sight of that the failure of the filter generally proves disastrous to the young life in the uterus in one way or another before birth or after it.

There is another evil effect that the failure of the natural protection of the unborn infant may have, to which I must briefly allude: I mean the production of malformations, deformities, and monstrosities. If the pathogenic germs, toxic substances, toxines, and the like make their way through the decidual membranes or the newly-formed placenta in the early weeks of ante-natal life, they may, and doubtless commonly do, produce abortion; but there is evidence also that they may sometimes so disorder the natural processes of formation of organs and structures as to cause the fœtus to be deformed or monstrous. It is believed that the germs and toxines which would cause disease or death of the fœtus in the later months of ante-natal life, produce malformations and monstrosities when they come into action at that early period of existence to which the name embryonic is correctly given. The filter at this period is not the fully formed placenta; there is doubtless a less defined transudation of materials from the mother's blood through the decidual membranes into the embryonic system; but there is good reason to believe that this filter also may fail, and that germs and toxines thus reach the embryo in the early formative period of its existence, with the teratological results referred to above.

The Causes of the Failure of the Filter.

It is obvious, if what has been stated above is true, that the best safeguard the infant can have in ante-natal life against the inroads of disease and deformity and death is the existence of a normally acting and effective filter which shall prevent the passage or nullify the influence of germs and toxines which may be present in the mother's system and which work havoc with the fœtal tissues if they can but reach them. In other words, the best protection for the fœtus from the second or third month of ante-natal life up to the time of birth is the presence of a healthy and functionally active placenta. There can be no doubt that, thanks to the filtering and modifying effect of this structure, the unborn infant is saved from many dangers due to the occurrence in the maternal system of disturbances of health due to microbes and other causes of disease. For instance, it is no uncommon thing to notice the birth to a woman far advanced in tubercular disease of a plump, healthy-looking child. The birth of such a healthy infant may occur even in cases in which there is proof that the tubercle bacillus was to be found in the maternal blood, and therefore in the placental tissues. Further, there is evidence that if the bacillus does in any case reach the fœtal tissues, does break through the placental barriers, then it develops with extraordinary rapidity and freedom in the organs and structures of the unborn infant, not, it is true, in the lungs (for these are inactive and out of the direct blood stream in ante-natal life), but in liver, spleen, brain, etc. In other words, the fœtal tissues themselves are not resistant to the invasion of tubercle bacilli; in fact, they prove admirable culture media for these organisms. The cases of definitely proven fœtal infection with tubercle are few in number, but the cases themselves have been abundantly established, and it is justifiable to conclude that the placental filter rarely breaks down in tubercle. But it sometimes does so. This leads me to the great question of the causes why in one case the placental barriers are passed by microbes or toxines, while in another they are sufficiently strong to resist all attacks.

It must be reluctantly confessed that we cannot say with certainty what the causes of the failure of the placenta to act as a filter exactly are. It might be supposed that the occurrence of a hæmorrhage in that organ would by breaking down the barriers between the fœtal and the maternal blood permit the passage of germs, toxines, etc., from the one organism to the other. No doubt this conclusion is warranted; but cases are on record in which the most careful examination of the placenta failed to reveal any such hæmorrhage, and in which, nevertheless, there was clear evidence that microbes had passed over to the fœtus. The cause of the breakdown in the barriers must, therefore, be a more subtle one; a gross lesion such as the existence of a hæmorrhage is not needed. In what exactly this subtle change consists it is not possible with any degree of accuracy to say—whether it be a variation in the osmotic forces on the two sides of the barriers or an alteration in the structure of the intervening membranes so fine as to escape easy detection, must in the meantime remain obscure. But we are not altogether without information on this most important point. It is obvious that if there are morbid causes which act specially upon the placenta itself they will more than any others tend to disturb the functions of the placenta, including the function of acting as a prophylactic filter. Now we know that there are such causes.

Prominent among the causes which tend to produce lesions of the placenta are syphilis, renal disease, lead-poisoning, fevers and high temperatures from any cause, heart disease, traumatism (especially blows on the abdomen), violent emotional disturbances, and last, but not least, alcoholism. These maternal conditions act in a prejudicial fashion on the unborn infant, and their mode of action, to my mind, is twofold. They affect the vitality of the placenta, and alter, therefore, its functions injuriously; they cause hæmorrhages into its substance, and so tend to weaken its use as an efficient filter; and they thus make it easier for noxious substances to pass to the fœtus, while they make it more difficult for the placenta to perform its duty as a respiratory and secretory and excretory organ for the unborn infant. But, further, they immediately endanger the fœtus's life, for the placenta is the most vital organ of the ante-natal economy, and anything that injures it strikes directly at the life of the child in the womb. There is perhaps a certain degree of novelty in the statement that the placenta is the most important organ that the fœtus possesses; but, so far as the continuance of ante-natal life is concerned, the assertion is absolutely true, for a fœtus may continue to grow and live in the uterus with almost all its organs diseased or deformed so long as it maintains uninterrupted relations with a healthy placenta. Of course such a fœtus has no value from the point of view of life after birth, but this does not alter the truth of the statement that ante-natal existence depends almost solely upon the integrity of the placenta.

To summarise the conclusions reached in the preceding paragraphs, it may be said that if the placenta fails to perform its protective functions, diseases, toxic products, and toxines which may exist in the mother will pass over to the fœtus, and either lead to its death and expulsion from the uterus or to a weakening of its strength and health, and to its death subsequent to its birth; that while it is not certainly known what conditions tend to break down the placental protective barriers, there is evidence that the diseases which cause lesions most often in the placenta itself will also render it ineffective as a filter and prophylactic safeguard; and that these diseases include in their number syphilis, kidney disease, lead-poisoning, heart disease, and alcoholism.

ANTE-NATAL CAUSES OF INFANTILE MORTALITY.

There are three ways at least in which ante-natal morbid conditions may influence infantile life and health, and I shall give a paragraph to each of these.

(*a*) *The Influence of Abortions.*

In the FIRST place, morbid conditions, such as maternal syphilis, nephritis, alcoholism, may cause abortion. An abortion is always a catastrophe. (I make a doubtful exception of the cases in which abortion is induced by a medical man to save a pregnant woman's life, for it is, in my opinion, rare for conditions requiring this procedure to exist.) It always means the loss of a life. The life, it is true, is that of an immature organism, and has no immediate value, for an aborted fœtus cannot survive its expulsion from the womb; but it is a life which if ante-natal conditions had continued to be normal would in a few months have been of precisely the same value as that of any full time infant. In these days when the nations of the civilised world are all deploring a falling birth rate the wastage of fœtal life by reason of abortions cannot be overlooked. If it be true, and I have reason to believe it is so, that one pregnancy in five ends, in city populations at least, in abortion, then it is at once evident that the prevention of all abortions would increase the birth rate by 20 per cent., while the prevention of one half of them would raise it by 10 per cent. This conclusion may be challenged, and it may be said that by the occurrence of an abortion at the third month, for instance, an opportunity is given the mother to become pregnant again, which could not, of course, have happened if she had been carrying her infant to the full term. To my mind this objection savours not a little of dialectics, and in practice the experience is that one abortion, far from preparing the way for a full-time labour, generally is succeeded by another abortion, and perhaps by a series. Further, instances are known to every medical man in which one abortion has finished a woman's reproductive life at once and for ever, by the evil effects it has had upon her generative organs. It may be said again that abortions are not infantile deaths, that they do not swell the mortality tables of infancy. This is statistically true, for, of course, if a fœtus does not live to be an infant, it cannot die as an infant; but it dies when it is potentially an infant, when but for a fault in the normal progress of ante-natal life it would in a few months have become an infant. Another criticism will be made, viz., that the fœtuses in abortion sacs are themselves already abnormal, and would never have come to anything even if the pregnancies had continued. I admit that there is an element of truth in this objection; at the same time I have been struck by the large number of miscarriages in which the embryo or fœtus has been apparently healthy, and in which the cause of the catastrophe was evidently to be looked for in the decidual membranes, or in the uterus of the mother. The conclusion, therefore, follows that abortions do increase the wastage of infantile life both directly and indirectly; and I believe that if these accidents could be prevented, the birth rate would immediately rise, and in the majority of the births the infantile lives thus brought into the world would be quite normal, while the mothers would enjoy more continued good health than otherwise would be their lot.

(*b*) *The Influence of Premature Births.*

In the SECOND place, disturbances of the ante-natal economy tend to cause premature labours, and premature labours tend to increase the infantile death rate. Of course, if the premature infant die during birth (is stillborn), then the statistical death rate does not suffer, for technically it is not a death; but it ought to be a death, and our tables of infantile mortality will not be complete till a place is found in them or beside them for stillbirths. But, further, all prematurely born infants are by no means stillborn; many of them drag on a precarious existence for a few days or weeks and then succumb. These, then, directly swell the death rate. Now, it is a commonplace among obstetricians, and more especially among the physicians in charge of maternity hospitals, that a premature infant has a better chance of surviving birth if it come from a healthy mother and have been brought into the world at an earlier date, not because of disease, but in order to get it safely through contracted maternal birth-canals. The premature infants that are born to diseased mothers are notoriously difficult to save alive, even with all the improvements and advantages that can now be given them, in the form of incubators, skilled wet nurses, and chemically corrected cows' milk. What, for instance, are the chances of life for the premature infant of a syphilitic mother, or of a woman who has had eclamptic seizures, or of one who has suffered from chronic Bright's disease during pregnancy, or of a habitual inebriate, or of a patient who has had placenta prævia or accidental hæmorrhage during the later months of utero-gestation? Not many, will be the answer of any obstetrician of experience. In some of these cases no doubt the cause of the death of the premature infant will be the transference to him from his mother of the germs of her disease or of the toxic products of it; but this is not necessary, for her malady may simply cut short her pregnancy, and her infant may be born before he has had time to become infected with her special disease, and yet he may die because of his prematurity alone. I need not elaborate this argument, however, for premature infants, whether the result of abnormal pregnancies or of normal ones, are notoriously difficult to rear, on account of the very fact that they are prematurely placed in surroundings for which their organs and tissues are not yet fitted. If then the infants that are born prematurely could be carried in the uterus till the full term of pregnancy, they would not be so likely to add to the mortality tables of early infancy; for the securing of this result it is essential that there be an elimination, as complete as possible, of the causes which produce ante-natal morbid states.

(*c*) *The Influence of Fœtal Diseases and Deformities.*

In the THIRD place, ante-natal morbid states of the infant tend to increase the infantile death-rate even when they do not cause either abortions or the birth of premature infants. It is not uncommon for a pregnancy to go to the full term and yet to find that the infant then born is diseased or deformed. The disease or deformity may have various results: it may, first, have interfered with health to such a serious degree as to produce ante-natal death, and the birth into the world of a dead fœtus (a dead-birth, which, of course, is not necessarily the same thing as a still-birth); it may, second, make it impossible for the infant to survive his birth, causing him to be, in other words, stillborn, in a way to which I shall immediately refer; it may, third, make it difficult for the infant to stand the strain of being born, for even in good circumstances getting born is a process which entails some danger, especially when artificial means have to be employed to complete it; and it may, fourth, make the post-natal life of the infant very precarious. I may give a few instances of some of the ways, just named, in which ante-natal morbid states increase infantile mortality. A child is born with a harelip and a cleft palate: the feeding of such a child was in no sense interfered with before birth, for he received nutriment by his umbilical cord from his mother through his placenta; but, after birth, this source of nourishment stops and the feeding of a baby so deformed either by means of a bottle or at his mother's breast becomes a difficult problem, and the difficulty is not always fully overcome even by the most skilful surgical operation. Again, a child is born suffering from congenital heart disease: this malady may be quite compatible with an ante-natal existence, for the conditions of the fœtal circulation differ from those of the adult and are not so exacting; but with birth a new state of matters arises, a new strain is thrown upon the heart which causes it to fail in its functions, more especially if an additional burden be placed upon it by reason of the development of a bronchitis or a pneumonia; and so it comes about that a "blue baby" (one suffering from ante-natal heart disease) is apt to live but a short time. Again, a fœtus may suffer before birth from a very grave form of skin disease, yet ante-natal life may run its course to the end, and the nutrition and general health of the child suffer scarcely at all; an instance of this is to be noted in connection with fœtal ichthyosis, a morbid condition far more advanced in type than any ichthyosis developed after birth ever is; as soon, however, as the infant is born and exchanges the moist, warm, and lenitive environment of the uterus for the dry, cold, and stringent one of the external atmosphere, the morbid state of his skin begins to cause pathological alterations of his internal organs which will result sooner or later in death. Yet again, the grave state of a mother in her pregnancy, as, for instance, in cases of maternal renal disease or of hyperemesis, may so interfere with the ante-natal nourishment of the infant in the uterus as to cause it to suffer from what is vaguely termed congenital debility; this morbid ante-natal state is the result in all probability of the passage of toxines generated in the maternal economy over into that of the fœtus; the child at birth is not suffering from the disease which the mother had in her pregnancy, but he is nevertheless suffering from the effects of it, and these effects show themselves in a depressed condition of all his functions and more especially of these (such as the digestive and pulmonary ones) which have not been active in ante-natal life but are only initiated at birth

The instances which have been referred to above illustrate very well the condition to which I have given the name of the postponed mortality of ante-natal maladies and deformities. An unborn infant may be very seriously diseased and yet continue to live on in the uterus; he may even be born without difficulty; yet, as soon as he enters his post-natal life the causes of death which were only potential before become active, and for him birth is but the gate of death. The question why more babies die in the very earliest days of life has not one but many answers: they die because of the birth traumatism and its effects; they die because they are improperly fed and because they are not yet inured to irregularities of temperature and to the like; they die sometimes because they are neglected, and so on. But it has always seemed to me that they die also because they should have been dead already, because they were only waiting, as it were, for birth in order to die. If the ante-natal environment could have been continued these infants might have continued to live; but in post-natal surroundings the morbid states which were not lethal before birth became so now with disastrous results.

In this way, therefore, it comes about that many of the deaths that ought to have been ante-natal come to swell the already high mortality which exists after birth.

Parental Alcoholism as a Cause of Ante-natal and Infantile Mortality.

It may be noted at the outset that I do not intend here to deal with the ways in which chronic drunkenness of the parents increases the mortality of their infants through carelessness, neglect, ill-treatment, overlaying, brutality, and the like. I shall refer only to the more subtle manner in which chronic inebriety influences the birth-rate and the infantile death-rate by producing morbid ante-natal states, some of which cause dead-births, others still-births, others congenitally delicate infants.

It is only of recent years that experimental methods have supplied us with the chemical proof that alcohol given to a pregnant animal finds its way to the fœtal tissues, while the demonstration that alcohol given to a woman in labour can be found in her infant at birth was also long in coming. The delay, however, in the establishment of proof of the transmission of alcohol from the maternal to the fœtal organism appears to have been due not to any difficulty in transmission, but to the extraordinary rapidity of it. This fact, taken in conjunction with that other fact, the great diffusibility of alcohol, explain the failure of previous experimenters to find the drug in the fœtus, the liquor amnii, and the placenta; they were too late in looking for it; it had already been and had gone again before tests were carried out to detect its presence. Some experiments upon animals have been made to determine whether alcohol administered to pregnant animals produced any recognisable lesions in their young ones, and the general results obtained were negative. The value of such experiments, however, is very problematical, and I can hardly conceive it possible for any one experimentally to produce a condition in animals equivalent to chronic alcoholism in the human subject; even if this could be done I should still be inclined to question the reliability of the results on account of the marked differences existing between the placental economy and the state of the nervous system as they are in animals and in man. Perhaps I ought to add that Palazzi (*Ann. di ostet. e ginec.*, xxiii., 357, 1901) did succeed to some extent in imitating chronic alcoholism in animals (rabbits); he gave them from 5 to 20 c.c. of alcohol twice daily hypodermically; the only result produced seems to have been sterility in nearly 50 per cent. of the cases.

While experimental evidence has therefore been chiefly negative in the case of alcohol given to animals in the later stages of ante-natal life, there seems to be no doubt that the same drug given in the early embryonic stages produces disastrous results. Féré's experiments upon the effect of alcohols and aldehydes injected into hens' eggs during incubation showed a most striking increase in the number of arrested developments and maldevelopments in the resulting embryo chicks. Further, the more toxic was the alcohol that was used the more numerous were the teratological effects seen in the chicks. I think, therefore, that these experiments do indicate that alcohol has an arresting effect upon embryonic development in its early phases. But, again, I am not inclined to argue much from animals to the human subject in such matters.

It remains, therefore, for us to inquire into the clinical evidence which exists regarding the effects which drunken parents may unwittingly induce in their offspring before the latter are born.

In an article entitled "On Alcoholism in Gynæcology and Obstetrics" the late Dr. Matthews Duncan brought together a good deal of evidence from older authors regarding the evil effects of alcohol upon the unborn child (*Trans. Edinb. Obstet. Soc.*, XIII., 105, 1888). He quoted from various authors to prove that in ancient times the Greeks and Romans forbade newly-married women the use of wine, less the fœtus should get harm; that drunken women if they conceived at all either brought forth their children before the full time or else produced feeble infants that lived only a few days; that children procreated in drunkenness were specially liable to convulsions, hydrocephalus, phthisis, atrophy, scrofula, and rickets; that children born of parents given to drink are often weak and morbid and die early; and that malformations and diseases of the nervous system were all more common in the descendants of habitual inebriates. From more recent writers he quoted confirmatory statements, more especially from the papers of Kirk (of Glasgow), Frank, Huss, and Lancereaux. Duncan also adduces evidence from his own experience to prove the baneful influence of continued over-indulgence with alcohol upon the whole process of reproduction in women, including the frequency of sterility, of abortions, of premature labours, or dead-births, and of the birth of delicate children. He specially emphasises the fact that it is in the soaker that all these effects are best seen; that in her, renal disease is set up and that many of the effects are due to this; and that lactation also is made difficult, and so the evil influence of the maternal habit pursues the child after birth.

Much more recent and much more statistically-valuable facts were reported by Dr. Sullivan in his articles in the *Journal of Mental Science* (Vol. XLV., 489, 1899), and the *Quarterly Journal of Inebriety* (Vol. XXII., 129, 1900). He specially investigated the reproductive history of chronic drunkards (women) in the Liverpool prison, and he avoided, as far as possible, the cases which were complicated by other degenerative factors. He found that of 120 female inebriates there were born 600 children, of whom 335 (55·8 per cent.) died under two years or were deadborn, while the remaining 265 (44·2 per cent.) lived over two years. In the case of sober mothers, related to the above-mentioned women, the rate of dead-births and early infantile deaths was only 23·9 per cent. Further, there was found to be a progressive death rate in the alcoholic family, the number of dead-births and deaths under two years increasing as time went on, these fatalities being more numerous among the later born than the first born children of these female inebriates. Sullivan's statistics showed "very clearly the progressively augmenting character of the influence of the mother's alcoholism ; it is specially noteworthy that the rate of stillbirths showed almost as marked a tendency to regular increase as did the death rate among children born alive." Further, there was a sensibly higher death rate among the infants of the mothers whose inebriety was developed at an early period ; thus, of 31 women who began to drink at least two years before their first pregnancy, 118 children were born, of whom 74 died in infancy or were dead-born (62·7 per cent.). Sober paternity seemed to have little influence, was indeed "almost negligible" ; neither did an inebriate ancestry appear to produce any great effect. Seven of Sullivan's cases had a special interest : in them conception took place in a state of drunkenness ; six of the children died in convulsions during the first months of life, and the seventh was stillborn. Sullivan was able also to report a fact of very considerable importance from the side of prognosis : he found that residence in prison with, of course, a compulsory stopping of all alcohol, often enabled an inebriate mother to give birth to a living and surviving infant. Such a fact emphasises in the most striking manner the cause of the previous dead births and the treatment which may hopefully be adopted in the future.

In my own experience I have been struck by the fact that in not a few of the cases in which a mother gave birth to a deformed child there was evidence of chronic alcoholism. One of the most marked malformations (epispadias and ectopia) that I ever met with in an adult occurred in a girl who was the offspring of a drunkard and a criminal lunatic; a fœtus with spina bifida, a caudal appendage, club feet and anchylosed joints, had both parents alcoholic; and there have been others. At the same time there have been many cases in which I could elicit no history of alcoholism, and some in which I could get no clinical details at all. In one instance it was stated that the parents of an anencephalic fœtus were both total abstainers; in another instance a malformed infant had a father who was a vegetarian by choice, and a mother who was compelled to be so by her husband, and both were probably abstainers.

I think it may be concluded, from the experimental and the clinical evidence combined, that alcohol has an evil influence upon ante-natal life and consequently upon the life after birth also; but this effect is due rather to the changes in the maternal kidneys and in the placenta than to any direct influence which the drug has upon the fœtal tissues themselves. It is very probable that the placenta allows the alcohol to pass over to the fœtus; but, being a readily diffusible drug its influence upon the fœtal tissues is of very short duration, and unless the alcohol is taken in so large a dose as to produce acute symptoms of poisoning it is not likely to harm the unborn infant directly. If, however, the mother be a habitual inebriate, then there is a tendency to the development of renal mischief; the placenta or the decidual membranes are in consequence apt to become diseased, with the result that premature births, still-births, dead-births, abortions and the birth of weak and puny infants follow. This, I think, is the pathological explanation of such striking statistics as those of Dr. Sullivan. As can readily be understood, the influence of the father will not be nearly so marked, and will be restricted to the cases in which procreation occurred during intoxication, and to those in which a long series of drinking bouts had induced deep-seated lesions of the paternal organs.

It must then be concluded that parental and especially maternal alcoholism of the kind to which the name of chronic drunkenness or persistent soaking is applied is the source of both ante-natal and post-natal mortality. It acts in all the three ways in which I indicated that ante-natal causes can be shown to act in relation to the increase of infantile mortality, viz., by causing abortions, by predisposing to premature labours, and by weakening the infant by disease or deformity so that it more readily succumbs to ordinary morbid influences at and after birth. By causing diseases of the kidneys and of the placenta it also leads to that failure of the filter to which I have already referred; the placenta being damaged, not only does the alcohol more readily pass through it itself, but it is also possible for other poisons, germs, and toxines to cross over into the fœtal economy. So it comes about that the most disastrous consequences are entailed upon the unborn infant in connection with syphilis, lead-poisoning, fevers, and the like in the intemperate mother.

The Development of Preventive Ante-Natal Medicine.

It is now time that I discussed the measures which may be taken to eliminate these ante-natal causes of infantile deaths. I shall throw my suggestions into a series of paragraphs, in each of which the keynote will be prevention. Since the causes affect the unborn infant, it is he who must be protected, and he can only be protected by protecting his mother. Ante-natal preventive medicine resolves itself very nearly completely into the hygiene of the pregnant woman and the treatment of her diseases.

(*a*) *Prevention of Pathological Pregnancies.*

Our knowledge of the physiology of pregnancy is somewhat imperfect as yet, and we cannot, therefore, understand all the pathological states occurring in it or set up by it sufficiently well to prevent them. Some of them may indeed be unpreventible, but I believe that of few of them will it be possible to say this in another decade or two. The first problem before us, then, is the acquirement of a satisfactory knowledge of the physiology of pregnancy, and this problem is not at the present time capable of complete solution. It will, however, be a useful guide for the obstetric physician if he will regard pregnancy as a severe and long-continued testing of the structural and functional integrity and adequacy of every organ and function in the woman's body. If there is a weak spot anywhere pregnancy will find it out and will demonstrate its presence; if there has been a violation of any of the laws of health, it may have passed unnoticed so long as the woman was unmarried, but with marriage and with pregnancy the violation is no longer a trivial but a vital matter, and must be regarded accordingly. There are probably few medical men who have not met with cases of renal inadequacy or nerve breakdown in pregnancy in which the relatives of the patient have not turned round upon them and said, "How do you account for this? Your patient was always a perfectly healthy girl and woman till now." The answer, of course, is that she showed no sign of disease, not because she was perfectly healthy, but because she had been imperfectly tested until pregnancy came to try every tissue and organ.

The first thing that should be attended to, therefore, in a pregnancy, and more especially in a first pregnancy, is to scrutinise the hygiene of the patient with a view of detecting any errors (in diet, in exercise, in clothing, in surroundings, in bathing, in sleeping, etc.), and of correcting them. The patient must be told that there were (for her) things that she could do, not indeed with impunity, but with less risk, when she was not pregnant; but that for her own sake as well as for that of her unborn infant she must now refrain from putting such strains upon herself. The hygiene of the non-pregnant may be erroneous and the woman *may* not suffer, but the hygiene of the pregnant must be perfect else she will almost certainly suffer either in her own or in her infant's health. There are, however, no *special* laws of health for the pregnant woman as compared with any other woman; it is the *special application* of the ordinary hygienic rules that is needed. I know, for instance, of no special articles of food that a pregnant woman must eat; but I am certain that such things as she eats with difficulty or danger when she is not pregnant will not be good for her when she is pregnant. Perhaps I ought to modify this statement slightly and say that there is some evidence that some pregnant women require more acid or more alkali or more salt in their food than at other times; but it is not in slight physiological divergences like these that danger lies. It is when a woman has been straining a weak pair of kidneys to the utmost with a rich and more than plenteous diet during her unimpregnated state, and continues to break the laws of health in this particular when she becomes pregnant, it is in her case that difficulty arises and danger which may suddenly run up to a maximum and end in the loss of two lives by reason of albuminuria and eclampsia. I have spoken of food, erroneous and excessive; but all that I have said applies with double force to drink, alcoholic and in excess.

For the actual application of a scrutiny of the carrying out of the laws of health during pregnancy it is necessary that the patient be under the medical man's eye. It is here that a difficulty arises; for neither the profession nor the public are yet sufficiently aware of the need for some medical supervision during pregnancy and more especially during a first pregnancy. I have not infrequently been told, when summoned to a case of convulsions in labour from renal breakdown, that the patient had engaged no medical man or midwife to attend her in her confinement, and had been trusting to secure one a month or a fortnight before the full time. Or I have been informed by the doctor that he had never gone to see his patient (although he had been engaged), nor had he tested her urine for albuminuria because he did not wish his patient to leave him for a less fussy, a less interfering and a more complacent practitioner. Women also have said to me that they would never think of sending for their medical man on account of some little trifling ailment of pregnancy ("which we all have"), but intended to speak to the nurse about it if a convenient opportunity arose. This state of things must be altered, and the medical man ought to pay an occasional visit to his pregnant patients, even if it be only to relieve them of some of the minor ailments of pregnancy, to keep their minds at rest, and to secure a regularly-sent sample of urine for analysis. Women, also, must learn to regard these visits and this amount of attention as a normal and not an unusual precaution. The minor ailments of pregnancy, as they are somewhat dangerously termed, are many, and their prevention cannot have anything but a beneficial effect upon the mothers and the unborn infants implicated. No patient, for instance, can fail to be better and happier for having a troublesome constipation and a painful attack of hæmorrhoids relieved.

(*b*) *Prevention of Abortions and Premature Labours.*

Knowing, as we all do, that an abortion means the loss of a young life, and a premature labour the endangering of one, we must welcome all means that are within our reach to diminish the frequency of the occurrence of both. There are many means, and I need not enumerate them all; but it may be well if I emphasise a few of them. In the first place, there is work for the profession still to do in educating the public to realise the full significance and evil effects of an abortion. There still are women who regard it as a perfectly legitimate and fair proposition to make to a medical man that he take steps to relieve them of a pregnancy which may be undesirable or inconvenient for them to have. When such a proposition is made to me, my reply is: "I cannot accede to your request for three reasons at least; in the first place, because I do not wish to imperil your future health and even your life, and such a procedure as you ask for would do both; in the second place, because I cannot lightly undertake to destroy a young life, even although it is as you say only an immature and ante-natal life with none of its potentialities yet realised; and in the third place, because I do not wish to run the risks associated with the commission of what may be a criminal offence." In such or in simpler language I repel the suggestion of provoking abortion and committing fœticide.

Again, I do not think that the risks of causing abortions which certain trades carry with them are sufficiently recognised and guarded against by women expecting to become mothers. Workers in lead, such as type-founders and pottery-glazers, are specially liable to abortion, premature labours and dead-births, as the statistics of Paul, made so long ago as 1860, show (*Arch. gén. de méd.*, i. 513, 1860). Much more recently, no little interest has been aroused by the publication of cases seeming to show that the use of diachylon was not uncommon for the very purpose of inducing abortion. Evidence of the abortifacient effects of mercury, arsenic, phosphorus, and tobacco is given in my work on "Ante-natal Pathology" (vol. i.); and the dangers to women workers of trades in which mercury, phosphorus, arsenic, and tobacco (*e.g.*, cigarette factories) are employed are insisted upon. It should be made almost impossible for a pregnant woman to run the risks above indicated; this is a work for women inspectors.

Again, the terrible abortifacient effects of syphilis ought to be more fully realised. No one, I am sure, can read Fournier's writings on this subject, or the pages in my book on "Ante-natal Pathology," in which Fournier's statistics and those of others are set forth, without recognising the appalling wastage of young life that this disease causes; death marks its progress from the earliest days of ante-natal life right through life, and, it is said, well into the life of the succeeding generation. Abortion is only one of the evil effects of syphilis; the other maleficient results are premature births, dead-births, diseases of the fœtus and placenta, congenital syphilis, and congenital debility. Any measures that may be taken to diminish the amount of syphilis existing in communities will immediately result in an increased birth-rate and a diminution of the infantile death-rate. In mercury we have fortunately a drug which has an immense curative effect upon syphilis both ante-natal and post-natal; but in this matter, as in so many others, prevention is infinitely better than cure.

Once again—and in this paragraph I speak more particularly to my medical brethren—we ought never to be content to allow a patient to go on having abortions, and we ought not to give ourselves the half comfort that is got from saying that such a patient has acquired "a habit of aborting." "Habitual abortion" is only a cloak for our ignorance. What ought to be done in the cases of continued abortion is a rigorous investigation of all the known causes of abortion until we detect one or other of them in our patient; it is then comparatively easy to treat the case, or, at any rate, there is the satisfaction of knowing that the cause is revealed even if, as in syphilis, it be a long and tedious business to counteract its ill-effects. I may emphasize here a suggestion I made several years ago that cases of habitual abortion should be more systematically dealt with in hospitals, public and private. We must, as a profession, fight against the paralysing conclusion that recurrent abortions are incurable, and against that dangerous popular belief that an abortion doesn't matter.

Finally, under this heading, I need hardly say that it is not uncommon to find that it is an easy thing to prevent further miscarriages. The correction of a uterine displacement will do it; the curettage of the uterus in endometritis may do it; the administration of mercury may do it, if persistently carried out; the giving of chlorate of potash may do it; the treatment of renal or hepatic or cardiac mischief may do it; and the simple medical supervision of the hygiene of pregnancy may do it, and does do it. The stopping of habits of intemperance does it.

(c) *Treatment of Pathological Pregnancies.*

Too often it happens that the *minor* ailments of pregnancy, as they are dangerously termed, are allowed to go untreated, and even uninvestigated, until they have grown into the major maladies of gestation. This is specially true of the morbid states which may arise in connection with albuminuria. Every obstetrician in charge of a maternity hospital knows that there is a much greater chance of saving the lives of both mother and unborn infant if an albuminuric pregnant patient is brought or comes into the hospital while the disease is still only in the early stage. The cases which die from eclampsia are those in which there has been no treatment prior to the supervention of labour and eclampsia or in which there has been no suspicion of the existence of the renal mischief at all. Since we have had in the Edinburgh Royal Maternity Hospital a bed specially set aside for the treatment of the diseases of the pregnant woman, I have had the satisfaction of treating cases of marked kidney disease in a preventive way (by milk diet, regulation of the bowels, skin, and kidneys, etc.), and with good results to the mother, and occasionally to the fœtus, although it must be confessed that the infants of albuminuric mothers are often delicate and difficult to rear. This leads me to refer to the subject of the establishment of pre-maternity hospitals, pavilions, or wards in connection with our maternity hospitals, for which I published a plea in 1901 (*British Medical Journal*, I., for 1901, p. 813). When a pregnant woman is attacked by a disease, and more particularly by a disease which is due to her pregnancy, it is often extremely difficult to obtain hospital treatment for her; it is even difficult to get her into a hospital at all, for many maternity hospitals do not receive patients until they are in the first stage of labour, and most general hospitals are chary of admitting to their wards women who are near confinement. And yet, as is well known, the diseases of pregnancy are most deserving of treatment in many instances, while in some cases a mother's and a child's life may be saved thereby. It was with reasons such as these in my mind that I proposed the establishment of pre-maternity hospitals in close association with our maternities, but not, if possible, within the same four walls, and not under the same nursing and administration. To these buildings pregnant women would be admitted, not because they were married, not because they were unmarried, but simply because they were the subjects of pathological pregnancies. In such pre-maternity hospitals the diseases of pregnancy would be made the subject of special study, and the best treatment, keeping in mind both mother and unborn infant, would be carried out. Failing the immediate construction of such institutions, I recommended the setting apart of one or two wards, or one or two beds, in the maternity hospital for the reception and treatment of pregnant women suffering from the maladies of pregnancy. My reason for pushing the larger scheme is that there is evidence that the residence of pregnant women in a maternity hospital for weeks or months before confinement has been shown to be not entirely free from risk. Apparently the association of the two classes of cases, the pregnant and the puerperal, is not for the best interests of the former; the want of exercise and interest is not good; and, in a word, there is a want of the special conditions of environment and diet and treatment which a pregnant woman needs, and which are not the same as those required by a puerperal one. At the same time, even the single bed that we have in the Edinburgh Maternity Hospital has been a benefit. It has, for instance, been a comfort for medical practitioners in the neighbourhood to know that they could send suitable cases into the hospital with the assurance that they would be taken in, not simply out of courtesy as it were, but by right; and I know from experience that the treatment such patients have received has been of value in averting abortion and miscarriage and in producing a more nearly normal state of health before the supervention of labour with all its risks. But it is, I think, unnecessary to elaborate arguments in favour of prematernity hospitals; they are self-evident, and further, the principle of them has been admitted in America and in this country since I published my plea for them in the *British Medical Journal*, in 1901, and in several other places and at several other times since then. It seems to me that without some such institutions the study of the causes and recognition and treatment of the diseases of pregnancy must continue to be greatly hampered and hindered. To mention only one advantage before passing from this subject to another, I may name that of being able to check the diet and the drink in cases of albuminuria and the diseases due to alcoholism.

(*d*) *Management of Premature Infants.*

I have elsewhere (*British Medical Journal*, I., for 1902, p. 1196) endeavoured to show on the evidence of anatomy and physiology what the special requirements of the premature infant are, and what means ought to be taken to reduce the great mortality that still has to be deplored in connection with such untimely born children. What can be done with care and knowledge, with the help of properly constructed and properly managed incubators, with the assistance of healthy wet-nurses, with the use of chemically correct cow's milk in lieu of human milk, is scarcely yet sufficiently known or appreciated in Britain. It is the environment of the prematurely born infant that is wrong. He ought to be still in the warm, moist surroundings of the uterus, sheltered from light, from friction, and from all external stimuli, and he ought still to be receiving specially prepared and partly digested juices through the placental economy. It is, of course, impossible to reproduce these conditions outside the uterus, even with the help of the best-known incubator, but an approximation to them can be reached. Further, it is not practicable perhaps to supply him with various chemical substances in just the combinations and ways that he would have got them through the placenta ; but it is at any rate possible to supply him with the iron and potash and lime salts which he has missed getting on account of his premature removal from his ante-natal surroundings. I have in several cases noticed the good effect of iron given in the form of the peptonate to premature infants both in private and in hospital practice. The blood corpuscles of the premature infant are plentiful enough, but the quantity of iron in them and in his tissues is defective. Just as prematernity hospitals are needed for the treatment of diseased pregnant women, so nursery hospitals or homes are needed for the scientific study and treatment of premature infants.

(*e*) *Other Suggestions.*

In order that other suggestions for the diminution of the infantile death and for the increase of the live-birth rate may become practicable, it is necessary that there be registration of still-births, the accumulation of statistics to show the effects of trades and occupations upon the occurrence of abortions and premature labours, and a further study of all matters relating to the physiology and pathology of the period of pregnancy. Most of the causes of infantile deaths are post-natal in operation; but ante-natal causes are not a negligible quantity and must be kept in mind.

In the absence of Dr. Sims Woodhead, his paper was read by the Mayor of Huddersfield, and Dr. Leslie Mackenzie read Dr. Ballantyne's paper.

Dr. Leslie MacKenzie (Medical Member of the Local Government Board for Scotland) supplementing the figures given by Dr. Sims Woodhead, said that in a book published by Dr. Aug. Ley, of Antwerp, entitled "L'Arriévation Mentale," he found the following interesting statistics. Out of 172 backward or defective children, 73 had alcoholic fathers, or 42·4 per cent.; 9 had alcoholic mothers, or 5·2 per cent.; 12 had alcoholic fathers and mothers, with alchoholic grandparents as well, or 6·9 per cent. Alcoholic meant those who were habitual drunkards, not those who were merely moderate drinkers. In the facts quoted and summarised in Dr. Newman's new book on infant mortality, which they were all glad to welcome, the figures were given of Dr. Sullivan in regard to the Liverpool prisons. Of drunken mothers 21, children 125, still-born 55·2 per cent.; sober mothers 28, children 138, still-born 23·9 per cent., or less than half. In 219 children born of the same mothers who lived, 4·1 per cent. were epileptic as against 0·1 per cent. of the general population. The results in epilepsy were thus 40 times more than in the general population. These were prison mothers. That was all it was necessary to say on the papers, but he cordially supported the proposal for the registration of still-born children.

(Councillor W. Fleming Anderson here took the chair.)

Dr. Lennane said that there was no subject connected with the problem of infant mortality so important as that of alcoholism. The two papers that had been read had a most important bearing upon it. Taking alcoholism from its physiological or clinical aspect, he thought that every medical officer of health, and every medical practitioner also, in London, was fully aware of the immense evil that the alcoholic habit causes in regard to child mortality in the metropolis. If a man could work as he had worked for fifteen years as a general medical practitioner before becoming a medical officer of health, in a poor district, and not become familiar with the evil results from the ingestion of alcohol in child-life, he must be very blind to consequences and facts. Surely all must be aware of the miserable effects upon the woman of chronic indulgence in the alcohol habit. Many medical men he knew were quite easily able to diagnose various cases in their clinical practice by simply looking at the woman as she came into the consulting room. He thought this was quite sufficient proof of the enormous amount of mischief alcohol wrought in infant life. As the President of the Local Government Board had pointed out, it was most consoling to think that the revenue of the country had suffered to the extent of £6,000,000 in the sale of alcohol. Mr. John Burns had pointed out in his eloquent address the consequences of heavy drinking by the working classes so far as regards the over-laying of children. From his own experience he knew that over-laying of children was largely the result of drunken mothers, and this was a factor in infant mortality in London at large. Sad cases frequently came under one's notice, and as illustrating the terribly demoralising state of affairs mentioned an instance of so-called overlaying, in which the mother had gone to bed drunk, and the child was found lying in a bucket of vomit at the side of the bed. If medical officers of health and others could only help in putting a stop to the habit of drinking among mothers, he thought it would prove to be an important factor as regards the diminution of infant mortality.

THE TEACHING OF THE HYGIENE OF THE EXPECTANT AND SUCKLING MOTHER.

By JOHN F. J. SYKES, M.D., D.Sc.

Medical Officer of Health, St. Pancras.

In the prevention of infantile mortality and seeking for the causes, attention was first specially directed towards the most obvious mode of the death of infants under one year, namely, by diarrhœa. The cause of this was first attributed to the high temperature of the summer season; then a telluric influence was suspected to be the cause, this influence being measured by the four-feet earth thermometer; then the cause was regarded as due to epidemicity, and the nomenclature altered accordingly; in their turn solid and patent foods were the guilty offenders; then the type of bottle and mode of using it were roundly blamed; next, the use of decomposing and polluted cows' milk was pointed at as poisonous; more recently hand-feeding itself has been marked as the peccant cause; and now we are slowly but surely realising that, although each of these participates in the chain of events, faulty maternal hygiene is the *fons et origo malis*.

We are beginning to recognise that diarrhœa and vomiting are the symptoms of the ultimate cause of death through the failure of the most active system of the infant to resist adverse influences—the alimentary system. This system, above all others, the infant depends upon, not only for life, but also for growth, and the less the viability of the newly-born infant the greater the probability that the system which has the greatest activity will be the most likely to break down, and the symptoms of this break-down are diarrhœa and vomiting. It is remarkable how resistant a robust infant may be to improper feeding, and in spite of it survive, from which it may be gathered that the process by which the growth and constitutional vitality of the infant is built up during nine months before birth is equally as important as that by which it is maintained and increased during nine months after birth. Both are dependant upon nutrition from the mother. Therefore the hygiene of the expectant mother takes first rank in chronological order, and consequent upon it and closely following it the hygiene of the suckling mother, and these precede all other considerations.

In a report upon Infantile Mortality presented to the St. Pancras Borough Council on December 7th, 1904, and a further report on February 9th, 1905, I showed that mortality statistics in St. Pancras indicate—that infants under one year are dying at a younger and younger age, apparently due to increased immaturity at birth, diminished viability or capacity for survival, and increased artificial feeding, and that a similar tendency appears in London, the total infantile mortality having risen, and the rise having been greater in the first six months of the twelve than in the last six.

In a paper upon Infant Mortality read before the Incorporated Society of Medical Officers of Health on February 9th, 1906, Dr. A. K. Chalmers showed that in Glasgow during thirty years past there has been a reduction of 15 per cent. in the total infant mortality rate, but that whereas the reduction was 30 per cent. during the second six months of the twelve, during the second *three months* of life the reduction was only 16 per cent., and during the first three months the mortality was stationary. Antenatal conditions show no improvement, little attention has been paid to them, and Dr. Chalmers says "permanence in the proportion of deaths under three months scarcely supports the surmise that with fewer births we are obtaining a more virile stock."

In order to make the position clear, the changes found to be taking place may be thus briefly summarised :—

A. As to the birth-rate.

1. In England and Wales the birth-rate is decreasing.
2. In England and Wales there is a decrease in the proportion of male births.

B. As to the mortality of infants under one year.

1. In England and Wales the mortality of infants from immaturity (premature births and congenital defects) has increased. (See Dr. Tatham's Tables, Report of the Physical Deterioration Committee, Vol. I, p. 132.)
2. In England and Wales the infantile mortality from diarrhœal diseases has also increased. (See also Dr. Tatham's Tables.)
3. In St. Pancras and Glasgow infants under one year have been dying at *proportionately*

younger ages, and in London as a whole there is a tendency in this direction.

C. *As to the decrease of breast feeding.*

1. There has been an influence at work to increase the separation of mothers from suckling infants by the increase of woman's labour.
2. There has been a large increase in the preparation, advertisement and sale of patent and modified foods for infants.

It has been assumed that the hand-feeding of sucklings has for years past been increasing as compared with breast-feeding. The indications in this direction are numerous and distinct; the increase in the number of patent and modified foods for infants of suckling age and their wide advertisement, the unfortunate frequency with which they have been recommended not only by lay friends, but also by nurses, midwives and chemists, and even by doctors, the light-hearted manner in which not only the fashionable but also the healthy working-class mother prematurely weans her babe unconscious of the risks it will run, the ready way in which the married factory girl returns to the factory and leaves her newly-born infant unsuckled, the promiscuous distribution of leaflets instructing mothers how to artificially feed their babies, and so on. These and other indications clearly point to the influences that have been at work, and it cannot be imagined that the result has been other than the increase of hand-feeding.

The causes of infantile sickness and mortality may be regarded from the point of view of the mother or of the suckling infant. In the former case they would be termed ante-partum and post-partum, and in the latter ante-natal and post-natal. Obviously, the ante-partum and ante-natal causes will fall under the head of ante-partum, equally obviously, although the ante-partum as well as the post-partum condition of the mother will affect the post-natal condition of the infant, the post-partum condition will have the most direct and most immediate result, so that the post-natal causes, so far as nutrition is concerned, may be classed with post-partum.

Infantile mortality, from the point of view of deficient nutrition and viability, may be expressed in the following form :—

A. Ante-partum and ante-natal causes.
- (*a*) As to the mother, resulting in
    - (1) Diminished vigour and reduced resistance to adverse influences.
    - (2) Deficient nutrition, growth and differential development of the embryo.
- (*b*) As to the infant, resulting in
    - (1) Premature birth, and death sooner or later after birth; or
    - (2) Deficient viability and early death, or feeble early existence.

B. Post-partum and post-natal causes.
- (*a*) As to the mother, resulting in
    - (1) Deficiency in quality or quantity of breast-milk; or
    - (2) Suppression of breast-milk through ill-health or designedly.
- (*b*) As to the infant, resulting in
    - (1) Progressive wasting, or
    - (2) Premature weaning; and Failure of the alimentary system.

Initial low viability and subsequent want of breast-milk are the main ultimate causes of the bulk of infantile mortality.

In St. Pancras, omitting those dying at birth before the establishment of breast-milk (14), and judging by the total number of surviving cases enquired into during 1905 (779), the proportion dying was, respectively, of the wholly breast-fed 24·4 per mille, of the mixed-fed 10·2 per mille, and of the wholly hand-fed 92·4 per mille, the total mortality being 127 per mille, and the mortality of the hand-fed and mixed-fed being over four times that of the breast-fed. This proportion is low compared to the experience of others. Dr. Robertson has found that in Birmingham over thirty times more hand-fed babies die than breast-fed from an equal number in each group. In Huddersfield it is stated that before the age of three months, fifteen hand-fed babies die as compared with one breast-fed. In Brighton, Dr. Newsholme has found that of babies dying from diarrhœa 6·5 per cent. were breast-fed, 5·0 per cent. mixed-fed, and 80·3 per cent. wholly hand-fed, and 8·2 per cent. mode of feeding undisclosed.

Of eighty-five deaths of infants from diarrhœa enquired into in St. Pancras during 1905, only 3, or 3·5 per cent., were wholly breast-fed, and 77, or 90·5 per cent., were wholly hand-fed, so that the mortality from this cause was nearly thirty times greater amongst the hand-fed. It may be added that it is rare now to find in St. Pancras that solid or farinaceous foods are given to suckling babes, and it may be taken that the high mortality occurs where the hand-feeding is with modified cows' milk.

Similar experiences of many medical officers of health could be quoted, but for fear of too much repetition. After all is said and done the most important point that stands out is the condition of the mother in relation to the embryo and the newly born —"Fragile beginnings of a mighty end."

Of ante-partum and ante-natal conditions there are certain that are moral and economic. The vices of alcoholic excess, the uses of certain drugs, and the incidence of certain diseases must be overcome by the moralist, but they bulk less largely than the great economic condition of poverty, which brings to the mother insufficient food, insufficient rest, excessive work, and extra stimulation, a vicious circle from which she can only be freed by the husband or the philanthropist.

Work is not injurious to the expectant woman provided it be not heavy or prolonged. With the same expenditure of money the food and drink may be nutritious or valueless, and even injurious, according to the knowledge and inclination of the mother.

It is here that medical advice becomes of so much value in directing the mode of life and the diet with a view to maintaining the health of the mother during some nine months' expectancy, and preparing her for suckling during another nine or ten months.

It is here, too, that the father has his part to play in helping to provide the necessary food and rest. When we appeal to the mothers of the country what shall we say to the fathers?

> "The woman's cause is man's. They rise or sink
> Together. Dwarf'd or godlike, bond or free;
> If she be small, slight-natured, miserable,
> How shall men grow?"

Assuming ante-partum conditions to have remained the same, we should have expected the mortality of infants under one year to have decreased *pari passu* with the death-rate at all ages under the influence of improved housing, greater cleanliness of the dwelling, diminished overcrowding, increased scavenging, extended sewerage, better removal and disposal of domestic refuse, and more perfect drainage, but these have been counteracted by increased hand-feeding, earlier weaning, diminished opportunity for continued breast-feeding due to the separation of the mother and the suckling for various reasons, diminished capacity to continue or even to commence breast-feeding due to the lowered health of the mother during the suckling period, or even earlier during the expectant period without later recuperation.

In regard to the feeding of suckling infants, the first thing is to reduce hand-feeding to the smallest proportion possible; it will then be an easier matter to deal with the few remaining hand-fed sucklings. In order to do this it is necessary to ascertain the causes of premature weaning and to remove them or to counteract them.

In St. Pancras, in 1904, it was ascertained that only about 60 per cent. of infants were wholly breast-fed; in 1905 the proportion had risen to 66·8 per cent. The actual numbers in each year were 457 breast-fed of 772 cases enquired into during 1904, and 530 of 793 cases in 1905.

In 1905 fuller enquiry was made into 277 cases of prematurely weaned infants, and the ages and causes of weaning ascertained. In 71 cases there was only partial weaning. Of the 206 cases in which there was premature complete weaning, it was found that 78 were weaned at birth, 73 within the first month, and 55 subsequently (mostly during the second and third month).

Of these cases prematurely weaned, it was found that from one-half to two-thirds were probably preventible. Now, if of the 33·2 per cent. of sucklings not wholly breast-fed in 1905, one-half can be prevented, it follows that 83·4 per cent. can be wholly breast-fed, and, if two-thirds can be prevented, nearly 89 per cent. can be breast-fed.

I believe that if proper and complete measures were seriously taken the proportion of partially and wholly hand-fed sucklings need not reach even 10 per cent. Baron Kanchiro Takaki, Surgeon-General of the Imperial Japanese Navy, informed me that 99 per cent. of the infants in Japan were breast-fed.

The causes of premature weaning are mainly dependent upon the mother, and of those that are dependent upon the infant a number are probably the effects of ante-partum conditions. The maternal causes of premature weaning are numerous, but there is a material difference between those that do not separate mothers and sucklings and those that do. The main causes which do not necessarily separate the mother from her babe are (1) purposeful weaning to avoid the irksomeness of suckling, this is mainly confined to the leisured class; (2) incidental weaning through insufficient knowledge, this is common amongst the working classes, as are also the following: (3) lowered health or vigour of the mother and deficiency of breast milk, mainly due to erroneous and incomplete hygiene, including improper and insufficient food; and (4) more serious ill-health due to various causes, some of which are also preventible.

The main cause which separates the mother from her suckling babe is "going out to work." In illegitimate cases the father shirks his duty and the law only compels him to contribute partially towards the support of the child and not at all towards the support of the mother during the period that she should be suckling her infant. This is a difficult social question, but it was a pleasure to read in the public press that, in the case of *McLaglen* v. *McLaglen*, in the Divorce Court on April 24th last, Mr. Justice Bargrave Deane ordered a baby which had been forcibly carried off by the father to be returned to its natural food at its mother's breast. The natural right of the child prevailed over the common law right of the father.

In legitimate cases the mother goes out to work either (*a*) because of the father dying, deserting, or idling, or (*b*) because the father is out of work through economic causes.

There is no doubt that in St. Pancras the number of suckling mothers who go out to work does not approach by far the number going daily from home to factory in some of our large manufacturing towns. It is in these towns that the separation of mother and suckling infant cries out loudly for prevention. The remedy I suggest is that infants of suckling age should not be admitted to municipal crêches and public nurseries, but that a manufacturer who elects to employ the labour of mothers with suckling infants on account of its cheapness should provide a cradle-room for the infants and give facilities to the mothers to suckle their infants at proper intervals. This would mean about a quarter of an hour in the middle of each of the forenoon and afternoon shifts. At present a premium is placed upon hand-feeding, which is destroying the vitality of the coming generation.

The length of time during which women should cease industrial work before and after confinement is still a matter of dispute. Most mothers, if sufficiently nourished, can do ordinary work, but exhausting work dries up the breast milk, especially that of ill-nourished mothers.

In a report towards the end of 1904, instead of weaning and artificially feeding infants on modified milk, I advocated supplementing the mothers' diet, and, in a further report, recommended as the only method of humanising cows' milk—passing it through the mother.

Madame Coulet, under the inspiration of Professor Coulet of Caen, was at that time (unknown to me) commencing to put into practical effect in Paris the feeding of necessitous suckling mothers, now carried on at a number of free restaurants, the only qualifications for admission to which are poverty and breast-feeding.

Why can this not be carried out in England guarded from abuse by the certificate of the woman inspector or voluntary visitor as to poverty, and by medical certificate as to health and breast-feeding?

There are numerous cases of malnutrition amongst our poor in which, on quitting the lying-in room, the breast milk dwindles or becomes impoverished. Many cases are known to nurses, midwives, and doctors, and if reported and assisted the breast milk might be saved and enriched.

"The very first of human life must spring from woman's breast."

In the hygiene of the expectant and suckling mother is contained the most powerful preventive of infantile mortality.

The teaching of the hygiene of the expectant and suckling mother has been said to be ideal. All work must be directed towards an ideal: the important question is whether the ideal is good, better, or best, and whether in adopting a good ideal as a temporising measure instead of a better you may not mar the best. If hand-feeding is encouraged breast-feeding will be discouraged, if breast-feeding is discouraged the incentive to maintain the health of the suckling mother will no longer remain; and, if the prospect of suckling be removed, the preparation of the expectant condition of the mother will be neglected, not only with disastrous results to the suckling of the infant, but also to the building up of its constitution before birth. It is dangerous to arrest a series of consequential natural events in any part of their course.

It has also been said that preventive medicine tends towards the survival of the unfit. The cultivation of natural processes rather than unnatural must be regarded as tending towards producing the fittest.

Every effort should be exhausted upon improving the health of the mother before directing efforts solely to the infant. The hygiene of the expectant and suckling mother cannot be taught to children in school, the wives and mothers themselves must be taught. Doctors, midwives, and maternity nurses must learn and must teach. Women inspectors and lady visitors must not only teach and influence mothers as soon as possible after the birth of infants, but must make every effort to reach them before. There should be no divorce of advice as to the mother from advice as to the infant that should be dependent upon her for well-being and nourishment. When such a divorce takes place the principal error is already committed.

For a long time past it has struck me that the promiscuous distribution of leaflets instructing mothers how to hand-feed their infants is beginning at the wrong end, and even prefixing a few words of advice as to breast-feeding does not correct the preponderant details of advice as to how to avoid breast-feeding.

In my opinion advice upon the cultivation of breast-feeding should be altogether severed from advice upon hand-feeding, and no leaflet of advice upon hand-feeding should be distributed promiscuously, but each such leaflet should be given only in each individual case to which it is applicable, and only after all efforts to establish or maintain breast-feeding have been exhausted and the medical adviser has definitely advised weaning, and the leaflet itself should bear the name and address of the particular mother's child to which it is intended to solely apply.

As to whether separate leaflets should be issued for the expectant and for the suckling mother may be a matter of opinion, and perhaps the preponderance is in favour of a combination, since from conception to weaning the infant is dependent for well-being and nutrition upon the mother for eighteen months.

It is contrary to physiological law to expect that a mother can with impunity suppress or neglect the natural function of such large and active organs as the mammary glands. There are certain bad effects upon the health of the mother which we know may follow the neglect of the function of suckling, certain others that are surmised, and probably certain others of which we are ignorant, observation or research not having yet traced them to their true causes. We know that mammary abscesses may arise from this cause, and we also know that incomplete involution of the uterus follows from inactivity of the breast functions. It has been surmised that amongst the excitants determining the localisation of cancer the suppression of breast milk is to be reckoned. When it is realised that the breasts yield from one increasing to three or four pints of milk daily, it can be readily realised what a profound influence the suppression of this natural process must have upon the physical and mental condition of the mother.

In the early part of 1905 the following card of advice was issued :—

ST. PANCRAS BOROUGH COUNCIL.

Public Health Department.

ADVICE TO MOTHERS.

The St. Pancras Borough Council find :—

(1) That a large number of infants are born before full time and die soon after birth ;

(2) That a large number of full-time infants are born so feeble as to live only a few weeks ;

(3) That a large number of infants are not suckled at the breast after being born ;

(4) That a large number of infants who are suckled at the breast for a few weeks are weaned too early ;

(5) THAT IT IS CHEAPER AND EASIER TO FEED INFANTS BY THE BREAST THAN BY HAND ;

(6) That it is simpler and wiser to take care of the mother's health, both before and after the birth of her infant, and to improve the breast milk, than to bring up the baby by hand-feeding, wholly or in part ;

(7) That the hand-feeding of infants is generally unsatisfactory, always risky, and in the summer dangerous and often fatal.

In these circumstances an appeal is made to ALL mothers to aid in practising and spreading a knowledge of the following system :—

MOTHERING.

The health of the mother is most important of all.

The mother must take care of her health so as to make her infant strong at birth, prepare herself to suckle her baby, and pay particular attention to the nipples.

Spirits and strong drink must be avoided ; plenty of good, plain, wholesome, nourishing food must be eaten, and the appetite improved by exercise in the open air.

A mother who improves her own health will also improve that of her baby.

When in doubt as to her health or habits a mother should not hesitate to seek medical advice at once.

SUCKLING.

A mother who has properly taken care of her health should be able to fully suckle her baby when born.

She should not be disappointed if the breast milk is scanty or not *fully* established for two or three days. The regular suckling of the baby will cause the flow to increase more and more.

If she continue to take care of her health she should be able to continue suckling her baby for about nine months.

THE BEST FOOD FOR THE BABY IS MOTHER'S BREAST MILK ALONE AND WITHOUT ANY OTHER FOOD WHATEVER.

If the mother's milk is poor in quality she should improve it by eating a greater quantity of good, plain, wholesome food, and improve her appetite by more exercise in the open air, and ABOVE ALL SHOULD AVOID SPIRITS AND STRONG DRINK.

If the mother has not enough milk the same measures will increase the quantity, and a cupful or two of milk half-an-hour before suckling will be an excellent help toward this, as THE ONLY WAY TO HUMANISE COWS' MILK IS TO PASS IT THROUGH THE MOTHER, AND NOT THROUGH A MACHINE.

The nipples should be cleansed and dried each time after suckling.

The baby should be suckled every two hours (gradually prolonging it to two and a half) during the first three months, gradually prolonging to every three hours during the second three and following months. The baby should be awakened for this purpose if necessary. Also twice in the night during the first month, once during the second month, and in the third month night feeding should be gradually discontinued. As the feeds are reduced in number the quantity of milk at each feed naturally increases. Feed the baby slowly; allow fifteen minutes or more for each meal. Do not rock the baby violently after it is fed. Do not feed a baby every time it cries.

Weaning.

When the baby cuts its teeth it is time to think of weaning, not before.

A baby's teeth may be expected to commence cutting between the seventh and the ninth month.

The usual time for weaning is about the ninth month.

Weaning becomes easier and safer if it is delayed until after the ninth month, soon after which the breast milk should be altogether stopped.

Not until the eighth or ninth month, or the teeth are being cut, is a baby able to digest farinaceous foods, such as baked flour, powdered biscuit, small crumbled bread, and fine oatmeal, and these foods should never be given to a baby until the teeth commence to appear. Never give the baby soothing syrups, teething powders, patent medicines, patent foods, or "baby comforters."

On no account should portions of the ordinary food or drink of the mother when at meals be given to the baby; they may prove injurious and even fatal.

Weaning Before Time.

A mother should not wean her baby before the seventh month at the very earliest, as weaning before time is dangerous to the baby.

Every effort should be made to put off weaning until after the hot weather has come and gone, as the months of July, August, and September are particularly fatal to hand-fed babies.

If the health of the suckling mother or of the baby is failing, a doctor's advice should be sought with a view to avoiding weaning.

If the health of the mother or the breast milk cannot be improved, and the doctor considers that the baby must be weaned or partly hand-fed, then it should be taken regularly to the doctor for advice as to the proper food and feeding.

A hand-fed baby's progress should be very carefully watched, and if it appears to be ailing or does not thrive, medical advice should be immediately sought, especially if there be any diarrhœa, as illness in a baby develops rapidly and is soon past remedying.

Medical advice can be obtained by a mother from her private doctor, or at the various provident dispensaries, hospitals, or other public medical charities, according to her means.

Further information may be obtained from the Women Inspectors, to whom messages may be addressed, at the Public Health Department, Town Hall, Pancras Road, N.W.

JOHN F. J. SYKES,
Medical Officer of Health.

March, 1905.

St. Pancras has been fortunate in having two women inspectors, B.A.'s of London, holding certificates, and thoroughly conversant with their work, in which they are enthusiastic.

This work, which Miss Bibby commenced, has been continued and elaborated by Miss Gardiner, since assisted by a staff of visiting ladies.

The experience is—

1. That working-class mothers are specially

anxious that their infants should be born healthy and robust and be healthily bred, and that they will make every effort and sacrifice to secure these results and welcome any advice and assistance to improve their own health and that of their sucklings.

2. That it is due mainly to want of knowledge, advice, and assistance that (*a*) a large number of infants are born prematurely and die soon after birth; (*b*) that a large number of full-time infants are born so feeble as to live only a few weeks; (*c*) that a large number of infants are not suckled at the breast after being born; and (*d*) that a large number of infants who are suckled at the breast for a few weeks are weaned prematurely.

3. That by means of proper advice and assistance the health of expectant mothers can be improved and prepared for suckling, and that of suckling mothers maintained; that the number of breast-fed infants can be largely increased; and that, as the mortality of breast-fed sucklings is so much less than that of hand-fed, the results of such action should be most beneficial.

4. That sick and weakly mothers, and consequently hand-fed sucklings, are special objects for medical supervision and guidance, each individual case requiring individual attention.

St. Pancras has also been fortunate in having as Chairman of the Public Health Committee Dr. R. M. Beaton, L.C.C., who convened the conference on the Prevention of Infantile Mortality, over which he presided in June, 1905, at the Town Hall, and which Sir William Broadbent, Sir Lauder Brunton, E. R. P. Moon, M.P., Professor Herbert Spencer, Mrs. Scharlieb, Miss Vaughan, Mrs. Fleming, and many other well-known persons supported. This conference, assisted by the women inspectors and a staff of lady voluntary visitors, gave an immense impetus to the movement and the elaboration of an organisation.

The system elaborated in St. Pancras is as follows:

A. As to receiving information.

1. *To obtain information of births at the earliest possible moment:*
    - (*a*) By weekly returns from the District Registrars (registration is often delayed from one to three months).
    - (*b*) By weekly returns from the London County Council of notifications by midwives (about 15 per cent. of the total number of births returned from one to two weeks after birth).
    - (*c*) By voluntary notification of births within one or two days after birth (only a few received, but if one shilling were paid for notification the number could be greatly increased).
2. *To obtain information of expectant mothers:*

Families with children and young married persons tend to congregate together in certain streets and houses and blocks of buildings. In these places the women inspectors and voluntary visitors are often introduced to expectant mothers when visiting suckling mothers.

Expectant mothers are also reached by several other means mentioned later on.

B. As to giving information.

1. *After birth:*
    - (1) The distribution of cards of advice—
        - (*a*) Sending by post a card of advice upon the health of the mother and breast-feeding to the mother of every infant registered as born in St. Pancras (about 112 a week).
        - (*b*) Sending by post a card of advice to every mother attended by registered midwife (about 18 a week).
        - (*c*) Sending by post a card of advice to any mother the birth of whose

infant has been voluntarily notified (occasionally).

(2) The personal visiting of mothers.

These visits are paid by the women inspectors and the voluntary visitors, who make careful inquiries and fill up a form relating to the circumstances of each case, give instructions supplementing and emphasising the information upon the advice cards already sent, and make note of any sanitary defects to be remedied and of any assistance that may be required.

(3) The reference of mothers and infants by means of introduction cards to—

 (*a*) Private doctors, provident dispensaries, public hospitals, etc., for the necessary treatment to induce, improve, or prolong breast-feeding.

 (*b*) Various religious and charitable organisations, in necessitous cases, for extra food and milk for the mother that she may be able to continue suckling her baby.

2. *Before birth :*

(1) Packets of cards of advice upon the health of the expectant and suckling mother and breast-feeding are sent to the doctors, provident dispensaries, hospitals, registered midwives, maternity nursing associations, maternity homes, etc., for distribution to expectant mothers.

(2) Packets of advice cards are sent with a circular to the ministers of every denomination, to be distributed by matrons at mothers' meetings, maternity missions, etc., and to be placed in every "maternity bag" intended for expectant mothers.

(3) Advice cards are sent or delivered in response to written or verbal requests from

expectant mothers who are usually anxious to obtain them when they hear of their distribution. Personal visits are also paid to those mothers, and if in lowered health are referred to and given cards of introduction and explanation to private doctors, provident dispensaries, hospitals, etc., according to their circumstances.

(4) Packets of advice cards are also sent to any medical practitioners wishing to distribute them early to their patients.

Professor Pinard and Dr. Variot have called attention to the success of puericulture, both before and after birth, at Creusot, where the immense manufacturing works of Messrs. Schneider are situated. Messrs. Schneider have proceeded by encouraging municipal and especially working-class sanitation by raising the salaries of workwomen so as to enable them to perform their functions of maternity, and by providing medical assistance to attend upon and advise the workpeople. Expectant mothers are properly advised as to hygienic measures; they are forbidden to work after the quickening, about the fifth month, or to return to work after convalescence until medically certified. The results have been a reduction in premature births, a reduction in infant mortality, and an increase of breast-feeding to over 80 per cent.

The Mayor, Mr. Benjamin Broadbent, in an open letter addressed to the mothers of Huddersfield, has described the success of his experiment, commenced in November, 1904, of offering £1 reward to every baby surviving the first anniversary of its birth in the township of Longwood. He has also described the series of regulations promulgated in 1894 by the Mayor of Villiers-le-Duc in France for providing early and free medical advice and attendance for the expectant mother and subsequently for the suckling mother and her infant, together with a grant for extra food during the lying-in and the suckling period, and it is interesting to note in the recommendations supplementing the regulations how the mother is repeatedly advised to consult the doctor when any deviation from health occurs in any individual case.

These methods are on right lines. There is room for municipal effort in teaching and promoting the personal hygiene of mothers in association with the medical and nursing professions, and the labours of sociologists and philanthropists, and

1. To teach mothers how to prepare for and maintain breast-feeding, and not to wean prematurely.
2. To assist ill-fed mothers in obtaining proper nourishment to prepare for and maintain breast-feeding, utilising existing institutions, societies, and associations.
3. To advise mothers that if they must go out to work they must take their babies with them to continue breast-feeding.
4. To persuade employers to provide cradle-rooms and facilities to enable the suckling mothers employed to continue breast-feeding.
5. To refer to medical attendants to advise those mothers who require special treatment to improve and maintain their health that they may order such necessaries for mother or suckling as may be required.

With regard to untimely, heavy, or prolonged work by pregnant and suckling women in factories, workshops, and workplaces, it is provided in Part IV. of the Factory and Workshop Act, 1901, s. 79, "Where the Secretary of State is satisfied that any manufacture, machinery, plant, process, or description of manual labour, used in factories or workshops, is *dangerous* or injurious *to health* or dangerous to life and limb, either generally or *in the case of women*, children, and *other class of persons*, he may certify that manufacture, machinery, plant, process, or description of manual labour, to be dangerous; and thereupon the Secretary of State may, subject to the provisions of this Act, make such regulations as appear to him to be reasonably practicable, and to meet the necessity of the case," and in s. 83 the regulations may, among other things—"(a) *prohibit* the employment of, or *modify or limit the period of employment of*, all persons or *any class of persons* in any manufacture, machinery, plant, process, or description of manual labour certified to be dangerous. . . ."

By s. 61 it is already provided that "an occupier of a factory or workshop shall not knowingly allow a woman or girl to be employed therein within four weeks after she has given birth to a child."

If, therefore, the Home Secretary could prohibit, or modify or limit the period of, the employment, in certain industries or processes, of pregnant women after quickening, more good would be done than by the indiscriminate prohibition of pregnant women to work for a fixed period before confinement.

If the Home Secretary cannot take action under existing provisions he should be given the power to make regulations for mothers during the expectant and suckling period as to the kind and amount of work they should be limited to in certain industries or processes after the quickening, and as to requiring employers to provide facilities for mothers to suckle their infants at intervals when at work during the suckling period.

In conclusion, it must be said that you cannot rear an imperial race on the bottle. History tells us through the ages that it was the mothers that reared the imperial races of the past, as they will continue to do in the future. If we intend to remain an imperial race, we must restore to its imperial place the dignity of motherhood, and repeat again and again: "The hand that rocks the cradle rules the world."

In the absence through illness of Dr. Sykes, his paper was read by Dr. A. K. Chalmers.

DR. CHALMERS said there were two points in connection with this, as with some of the other papers, to which he wished to refer. We stood greatly in need of some means of keeping the children well instead of by advising their mothers only after they are ill. The only name he could think of was that of nursling dispensary. He was glad to say that the maternity hospital in Glasgow was gradually awakening to the gravity of the position. It was about to invite the mothers to bring their children monthly or fortnightly, so that a regular system of supervision could be maintained over those children for at least a year after birth. That gave rise to the suggestion that if in France it were thought necessary for babies born in maternity hospitals, why not others? Then, again, we had sick children's hospitals in this country, but the sick children's hospitals did not take the children until they were two years of age. It was perfectly true that the number of children under two years of age so attended to had greatly increased, but that was because surgery had been able to reclaim many not formerly treated. Still we were without nursling dispensaries where the expectant mother could go, or take her child the first time she was able to leave the house, with a view to asking whether the child was thriving or otherwise. If they were to do this work or make any effective attack upon infant mortality on an extensive scale, he felt they had to call in all the aid that maternity hospitals can give us, and largely extend the facilities which the present sick children's hospital system affords.

Dr. Barwise said there was one point in connection with Dr. Sykes' paper which was worth calling attention to, and that was the restaurants which he had seen in Paris. No questions were asked, no money required, and although a charity the restaurant was most exclusive. They were doing a work for the State, and the people of Paris recognised that they should do everything for the mother. A good hot, nourishing meal was provided, the only qualification being that the mother should be feeding the child herself. He could not help imagining what a difference there would be between such institutions in Paris and similar institutions if they were ever started in this country. Here they would be managed by a ladies' committee, and he was afraid that one of the first questions asked of the mothers would be whether the child was legitimate. The facts as to what was being done in Paris were not sufficiently well known yet, but he felt that the system was a new factor in dealing with this problem, which Dr. Sykes had done well in calling the attention of the conference to in his interesting paper.

Dr. Vacher (Cheshire) spoke favourably of the nursling dispensaries referred to by Dr. Chalmers and mentioned in Dr. Sykes' paper. No doubt such institutions were of importance, but the inference was that they were not supplied. But in his own district a nursling dispensary was supplied by the local children's hospital, and in the town in which he lived he happened to be the consulting medical officer to a large children's hospital. It was quite usual there for mothers to bring their young children for advice, and the children had always been brought there between infancy and two years of age. The demands had grown so much that the accommodation was altogether inadequate, and they were spending about £800 in converting the dispensary department into a nursling department. At all events, in the town a nursing dispensary did actually exist and was in excellent working order. There was, however, one hiatus in the assistance given to the service of preserving infant lives, and that was indicated by what he saw many years ago in a visit to Moscow and St. Petersburg. He happened to be at a large Moscow hospital between nine and ten one morning, and there was a little wicket through which any woman might pass her illegitimate child. The child was weighed, measured and distinguished, and a little bone containing all the particulars was given to the person bringing the child, and a similar bone wàs hung round the child's neck. That child could be reclaimed by the mother, when in better circumstances, up to ten years of age. After that age the mother was not allowed to claim it, because it was found that women deposited the children at the hospital and claimed the child at a time when it was old enough to earn money. Something of that kind might be done in this country, but it would have to be hedged round so as not to offer a premium upon illegitimacy. But the system had proved a great blessing in Moscow, and he did not see why a similar result should not be achieved in an English town.

Mr. Black (Lanark County Council) opined that the question of alcoholism was at the root of the problem of infant mortality. He came a great deal into contact with this aspect of the problem, and believed that if they could do something to grapple with this evil they would go a long way towards reducing the high rate of infant mortality. A conference of that character ought to bring something practical to bear upon it. To his mind it was simply a question of education. They had to educate the people and the parents, especially the coming parents, as to consequences to children of over-indulgence in alcohol.

Alderman Gee referred to the advice given to mothers at the end of the paper of Dr. Sykes, that if they must go out to work they should take their babies with them to continue breast-feeding. As one who had much practical experience in mill life, he said that was absolutely impossible. Such a suggestion could not be carried out. Such a measure would never stop the waste of infant life. As to the fourth suggestion, that employers should be persuaded to provide cradle-rooms, he thought it was absolutely ridiculous to talk of such a thing. Employers would not do it, and what was more he, as a workman, did not want to see it done. The remedy was to keep the mothers at home, and in order to keep the mothers at home the employers of this country must give the men more wages.

Dr. Barwise pointed out that Dr. Sykes had only made the suggestion tentatively. All the people worked in the mills in Lancashire, and if the children were taken there it might not be long before the Home Office interfered.

Dr. Moore (Huddersfield) said he believed there was a mill in Blackburn where there was ample provision for the mothers to nurse their infants. But whether that was the fact or not, he thought he was correct in saying that in Paris there were many places where mothers worked where there was such provision. They all knew that the French people had devoted considerable attention to this and allied questions, and this was one of many excellent provisions they had made to save for the French nation the population which, for military reasons, they valued so highly.

Councillor W. Fleming Anderson (Glasgow) emphasised the point in Dr. Sykes's paper, which he was glad to think was now being taken up by one or two of the best ladies in Glasgow, that if we want to deal with infantile mortality it is not time to start when the infant is ill, but that we should seek to deal with the mother previous to her confinement, and to seek to feed the mother if she was otherwise unable to get proper food after the baby was born. The unfortunate thing in this country was with the illegitimates; they were oftimes quite as healthy as the legitimate infants, yet they died twice as quick. In one city which had been mentioned three out of every five die inside twelve months, and a good deal of the cause of that was Mrs. Grundy, or what he as a public man called the mistaken notions of society. The woman was ostracised, the man was not. When he paid, if he did pay at all, it was a miserable pittance that would hardly keep the child living, not to speak of the mother. If the mother went to an institution because she was starving, because her child was illegitimate that was a black mark against her for all time. In France, where child life was so necessary for the safety of the State, if a woman was about to become a mother and was hungry, that was quite sufficient justification for her to be fed; if a mother, and she was nursing her baby, that was also sufficient to enable her to get two meals a day. He certainly suggested that some of their church ladies—he was a "goody, goody, go-to-meeting" person himself—working to supply people who attended four different missions, at the same time, with a lot of things for themselves, should adopt some systematic method of attending the police courts of a morning, where one-third of the accused were women and not another woman in court for them to look to or speak to. If they would only try to help those women and their children in that fashion he had not the slightest doubt that soon an impression would be made upon the rate of infant mortality which they all deplored. Surely the time had gone past when because of the accident of birth, because a child happened to be illegitimate, that this should be looked upon as a social offence, that the mother should be punished first, and then the child. The mother was punished in conscience and soul all the time, and the little one was often punished by a premature death. Therefore he most heartily agreed with the suggestion of Dr. Sykes that in addition to feeding the infant and preventing it becoming sick, we should as a body of men and women who are engaged in preventive medicine, also, if we possibly can, save the child, helping those women who at present could get no help.

Dr. Templeman (Dundee) mentioned a little experiment which had been made in connection with suckling mothers at Dundee, on the lines of the work in Paris. The Social Union of Dundee started a restaurant for nursing mothers, and the only point insisted upon was that the mother should be nursing her child. If that condition were fulfilled the mother was provided with two nourishing meals a day at a cost of 1*s*. 6*d*. per week, and a gentleman had kindly placed at their disposal a sum of £100 per annum for three years for feeding those nursing mothers who were not able to pay the small sum charged for the meals. In addition to this, arrangements had been made with the maternity hospital that necessitous cases seeking help from the hospital shall be entitled to use the restaurant and to free food if necessary for at least the last month of their pregnancy. The experiment had only been carried on a month, it was in fact in its initial stage, and they could not say what the effect would be. But in Paris it had been carried out most successfully on those lines, and it was hoped that with other measures adopted it would have the beneficial effect in Dundee of mitigating the heavy infant mortality.

The Mayor of Huddersfield (Alderman B. Broadbent) threw out as a suggestion, which might be of some value at the present moment, that besides having some organisation for feeding both actual and expectant mothers it would be better if they could establish some maternity fund to enable mothers who were looking forward to the birth of their children to lay by some provision for their future necessities during confinement. But he sympathised with every possible measure that could be devised for the preservation of infant life. He rather agreed with his friend Alderman Gee that they did not want to make it too easy for mothers to go out to work. They did want to make the mothers what Mr. John Burns described as "mothers always at home with their children." That, he believed, was the secret. By means of a maternity fund, supplemented by charitable gifts, mothers could be fed at home better than in a restaurant, as they are doing in Paris and elsewhere. But he did not wish in any way to discourage any single effort for improvement. All efforts were good.

The conference then adjourned.

SECOND DAY—Morning Session.

Alderman Evan Spicer, M.P., again presided.

THE EARLIER NOTIFICATION OR REGISTRATION OF BIRTHS.

By Alderman BENJAMIN BROADBENT,

Mayor of Huddersfield.

To anyone commencing an investigation into the causes of the deaths of infants it would appear to be manifest that the first fact to be learnt would be as to when, where, and under what circumstances the infants came into separate existence. It is clearly impossible to do anything to prevent the death of an infant unless there is first the information as to its birth. Although this demand for knowledge of an perfectly obvious fact is very simple and absolutely necessary as a preliminary to any further inquiry, it is just the very fact which is most difficult to ascertain. By the very nature of things the birth of a child is usually an obscure event, important only to the particular household where it occurs, but counted as of no moment to anyone outside a very small circle. According to English law, no cognisance is taken of the birth of a child before it is six weeks old, when civil registration has to take place, in Scotland the period is three weeks, and Ireland has the same period as England. As to the practice in other countries there is no information whatever available without special inquiry, except in the case of France, where the low birth rate and the consequent stationary condition of the population has given rise to very particular attention being paid to the infant. In fact, France appears to be the first country which has discovered the baby. It may be taken as an indication of how little attention has been paid to the birth and early life of infants that neither the Registrar-General's Department, nor the Local Government Board, nor the Midwives' Board, have any record as to what is done in other countries in regard to registration of birth. Contrast this lack of information as to births with the superabundant information as to the record of deaths, and one becomes aware of the curious paradox that death appears to be a much more important and interesting event than birth.

The termination of life strikes the attention, but the birth, when life commences, and the earliest days of life, when development is most rapid, when dangers to the whole prospective existence are most rife—these escape notice altogether, and we do not know, nor indeed care, what is done to record the newly arrived. Even in France, where the registration has to be very formally made within three days under severe penalties, no use is made of the record so far as connecting the event with the general health administration. In fact, it does not appear ever to have occurred to any administration in any country that the birth of an infant should be an event to be noted by the health authorities. Unless indeed it should happen to die or to have some dangerous infectious disease, there is nothing in our own law to bring the Public Health Department into connection with infant life or health.

It might therefore appear that it would require some argument to advocate so novel a proposal as that all births should be notified or registered immediately upon their occurrence. I do not however propose to offer more than certain simple considerations which appear to me to be conclusive as to the necessity of this measure. I would first observe that a very large proportion of infant deaths occurs at the earliest ages; and, so far as we have figures to go upon, there appears to be an almost regular diminution from week to week. That is to say, of the infants who die in their first year half die within the first three months after birth, and of this large proportion half again die within the first six weeks after birth; in other words, about one-fourth the deaths of infants under one year of age occur in the period before the law takes any cognisance of their existence at all. I present the same fact in another aspect: the number of infants who die in the first week after birth is much larger than the number who die in the second week after birth. So also the number who die in the second week is much larger than the number dying in the third week, and so on in inverse proportion progressively. Hence if any notice at all is to be taken of the causes of these infant deaths, and if any attempt is to be made to prevent them, we ought to be made aware of the birth at the earliest practicable moment. It is too late to begin to save infant lives when already a large number have been lost. Any effort that is to be made to prevent death or injury to health cannot begin too early.

Here also comes into consideration a fact which makes the necessity for early attention to the new life most urgent and most pressing. It is very well known that infants fed on the mother's milk are in every respect in better case than those artificially fed. The proportion of deaths, under ordinary industrial conditions, of infants fed by the mothers as compared with the deaths of infants artificially fed, has been shown by Dr. Hope, of Liverpool, to be as one to fifteen, and if there is such an enormous difference in the deaths, it may be taken as an indication of an equally important difference in the health and stamina of those who survive. Taking it then that the mother's milk is the prime necessity for the infant's well-being, it becomes of the first importance that the mother's milk should be secured to the infant. That is to say, the mother must be induced, if practicable at all, to begin to suckle the child at once, so that the flow of milk may be kept up; if anything is to be done in this direction it must be done within the first three days. The urgency of retaining the mother's milk is the most cogent reason for requiring early notification of birth, so that the mother may be encouraged to attempt to supply her infant with the food which is its only birthright.

It might be urged that the natural and almost inevitable usage is that the mother should feed the child from herself, and that it is not necessary for any outside influence to be brought to bear to urge what is so natural. Unhappily there are too many proofs that in this respect the natural instinct is weakened, and in not a few cases absolutely destroyed, by modern conditions, and it is too often the case that the attendant at the birth is ignorant and prejudiced, and totally unfit to give wise advice to the mother. Probably this particular condition will be changed in the course of a few years by the operation of the laws relative to midwives, but at present there is the gravest reason to think that the so-called midwife is entirely unfit in this respect, as in many others, to be the adviser and helper of the mother. Neither natural instinct in the mother herself, nor the ordinary unskilled attendant, can be in the least degree trusted to bring about natural breast feeding. There is a necessity that there should be brought to the mother help and advice, prompt, skilled, and trustworthy, within a very short time of birth, to prevent the newly born being robbed of the sole right with which it is endowed on entering into existence—the mother's milk. Seeing, then, that the child's fate with regard either to continuing to live, or having a healthy life, depends really on how it is treated in the first few days of life, it is absolutely necessary that the birth should be known and the mother induced to do her duty as early as possible after the birth.

If it be granted that early notification or registration is necessary, there still remains the question to whom should the notice be given to, and the somewhat hasty conclusion might be arrived at that the registration laws should be altered for this purpose. This would not only be a very large undertaking, but it would be of very doubtful advantage as a measure pertaining to public health. I have no desire to say a single word against our present registration system, which is perhaps as complete, and thorough, and useful as any in the world; but if the suggested early notification were given to the registrar, it would be of no special advantage so far as registration is concerned, and it would be of still less value to the infant whose birth was so registered, or to the mother. The registrar could do nothing for the infant or the mother. As a mere civil member of the community an infant is really of no consequence: it can do neither good nor harm; and whether we begin to count it amongst the population at three days, or three weeks, or three months, makes very little difference. But looked at from the point of view of the health authority, which has to safeguard the community from everything that makes against its physical well-being and stamina, from this point of view the infant is of the greatest importance, at least from its birth, in reality from long before its birth. The health officer knows that these small infants will affect his mortality returns; he knows that upon them will depend whether the vitality of the population will be strengthened or deteriorated. In his view the infant of to-day is the school child of a few years on, and the manhood and womanhood of the country a little later, and what the infant is such will the child be, and such the man and woman. It is to the health authority and to the health officer that the infant is really interesting, not to the Registrar-General or any of his subordinates. It is therefore to the health office and health officer that the notification must be made.

But not only is the health office suitable from its natural relation to vital statistics and public health: it is also most easily capable of making the best use of the information. It requires no change whatever in the ordinary organisation of a health department. Where there are already women attached to the department all that is needed would be a certain measure of specialisation. A woman inspector would quite naturally be told off for the special duty of receiving the notices; she would keep a proper note of them, would visit the mother, and give suitable advice. It would probably necessitate a little strengthening of the staff, and perhaps some greater specialisation. Where there are not already women in the health office, it would necessitate the appointment being made. It appears to me a most fortunate circumstance in our own country that our health organisation affords such an easy and ready way of making the best use of early notification of births. It is a grave defect in the French system that there is no such organised connection between registration and public health administration. I venture to hope that this suggestion of early notification of birth to the health authority may meet with the approval of the Conference; and I would point out that it is within the power of health authorities to obtain the application of this principle either voluntarily or by law. I may mention that the Corporation of Huddersfield, in the present session of Parliament, has promoted clauses which confer upon the municipality the power to require notification of birth within two days. The clause being a new one, was very carefully considered by the Police and Sanitary Committee of the House of Commons, and, after full consideration, the Chairman announced the decision of the Committee most favourably, saying that the Committee were unanimous in passing these clauses, complimenting the Corporation on the manner in which the case had been presented, and expressing the hope that the success might be such as would lead to a more general adoption of such a measure. One of the witnesses (Sir William Broadbent), in reply to a question from a member of the Committee as to whether the measure was so desirable that it was worthy of the consideration of the Government generally, stated that this was undoubtedly the case. It would, he added, lead to an enormous saving of infantile life, to very great preservation of infantile health, and have a very great influence on the general health of the community.

MEMORANDUM ON THE EARLIER REGISTRATION OR NOTIFICATION OF BIRTHS.

By E. W. HOPE, M.D.,

Medical Officer of Health, Liverpool.

A NATIONAL conference, such as this, is sufficient evidence that one of the most prominent, perhaps the most prominent fact, in the mind of every sanitary expert is the excessive sacrifice of infant life, associated in the great majority of cases with want of knowledge on the part of the mother. This want of knowledge reveals itself in acts of profound stupidity, or in omissions amounting to the grossest negligence. This is no new fact. On the contrary, it is one which has painfully impressed every sanitarian for many years.

I have many times in the last twenty years made personal and systematic inquiry into the circumstances of a sufficiently large series of deaths of infants to justify certain conclusions. Time after time, inquiry after inquiry, the same results has been arrived at, namely, that, more than anything else, it is want of care and want of attention on the part of mothers which leads to the disastrous results.

One of the earliest of my investigations was in 1886, when, in conjunction with several members of the Liverpool Medical Institution, we came to the conclusion that out of 1,000 infants under three months of age who were suckled at the breast 20 died, while out of the same number of infants at the same age who were artificially fed 300 died, which is about fifteen times as many. Subsequent observers have approached the question from other standpoints and have come to the same results. It is clearly therefore an advantage, having regard to this mortality under three months, that all available information should be given as soon as possible.

The high mortality amongst infants, however good their surroundings, and however intelligently maternal care is exercised, arises from many causes. A certain proportion are premature, and cannot all survive; some are born with malformations and other defects which soon terminate their existence; others, the offspring of weakly parents, cannot long survive; and, in spite of all care, there is a large proportion who will succumb to one or other of the many ailments to which infancy is susceptible. Making due allowance for these, it may be taken that an annual death-rate amongst infants of 80 per 1,000 is unavoidable, and if this be granted, it follows that anything above this is preventable, although the necessary means to prevent it are so extremely difficult to apply that even in the best districts the loss of infant life is in excess of the standard.

In the poorer districts it is plain to the most casual observer that necessary care and attention are not given to infants. Nothing is more common than to see the infant handed over to the custody of children or irresponsible persons whilst the responsible guardians are either at work or engaged in some other occupation. The children of the very poor are in this way exposed to neglect and inattention which is practically unavoidable, and which, together with improper food and scanty clothing, is reflected in the sacrifice of life. But yet it is found that in the districts of highest mortality, whilst there are instances in abundance of families in which every child has been reared, there are examples, far too numerous, in which all or nearly all of the children have perished in infancy, or before attaining to the age of five years.

In the course of a more recent inquiry into infantile mortality, 1,082 families in which the death of an infant had occurred were taken consecutively, and certain particulars concerning them ascertained. The total number of children born in these families had been 4,574, but out of that number 2,229 had died, practically all in infancy, representing 487 deaths out of every 1,000 born, a waste of life six times as great as the standard alluded to. But the most remarkable series of excessive fatality occurred in twelve families in which the large total of 117 infants had been born, and no less than 98 had perished in infancy. These extreme examples, it must be remembered, are occurring in families in which, so far as municipal sanitation is concerned, there is very little to choose between them and many of the families who rear all or nearly all their children, nor can it be shown or inferred that there was any inherent weakness in the offspring, since those who have survived are of fair physique, not as a class suffering under any inherited condition likely to terminate their lives; but it is in the personal and domestic circumstances that the contrasts are most marked. The immediate inference from it is, that the remedy for some at all events of the evil is education, and many measures have been adopted to apply this remedy.

In the City of Liverpool more than twenty years ago, simple instructions prepared by the Medical Officer of Health upon the rearing of infants, and upon simple rules of health, were printed in pamphlet form and distributed broadcast in the poorer districts of the city at the cost and charges of the Health Committee. In later years these instructions were simplified, and supplemented by placards, which at the commencement of hot seasons were placed in every court, every alley, and every back street, whilst the instructions were handed into the houses on neatly printed and attractively prepared cards. In 1897 a staff of trained and qualified female visitors was appointed, one of the most important of their duties being to give instruction upon those questions. The Health Committee, however, realised the great difficulties experienced by mothers who could not suckle their infants in providing a proper substitute for breast milk. In order to meet that difficulty milk depôts were opened for the preparation of suitable food, and this milk is now distributed from some twenty-eight centres. Much labour and care have been expended and much cost incurred in endeavouring not only to teach mothers the way in which infants should be fed, but in providing them with proper and simple food to tide over the season of danger. Finally, for the last two years hospital accommodation has been provided during the hot weather for cases of infantile cholera which cannot be treated at home.

It was still felt, however, that in many ways these systems admitted of greater precision, and more especially in the direction of getting the information into the hands of mothers at a sufficiently early period. No doubt in many cases the information was given long before the birth had been registered, but the Health Committee felt that some arrangement might be come to by which, in all cases where it was thought necessary, cards of instruction should be given to mothers at the earliest possible time. The defect in the law in not requiring the registration of births until six weeks after birth was fully recognised, but it was also felt that if as soon as the birth was registered the person registering it received a copy of the instructions upon the rearing of infants some useful purpose would be served. With this object the district registrars were asked to give a circular to each person registering a birth. No fee, however, was proposed for this work, and many of the registrars did not view it with favour, and finally the Registrar-General, who was appealed to, declined to grant permission for the giving out of any card of instruction of any kind. The possibility of getting parliamentary powers was not regarded as promising, since the practice of amending a general Act in the case of one particular district is not regarded with favour, several such suggestions on the part of the Corporation having been unattended with success. With a view, however, to follow out the principle as far as circumstances permitted, the Health Committee made arrangements to copy from the register of births in the possession of the Education Department all entries in which it appeared from the locality that some instruction would be useful.

This briefly outlines the progress of the measures adopted in Liverpool during the past fifteen or twenty years to meet this particular case.

There can be no doubt that arguments in favour of an earlier registration of births throughout the country are incontestable, and the initiative taken by the Mayor of Huddersfield in obtaining a clause in a local Act to ensure the earlier registration of births will, it is hoped, be attended with a sufficiently definite advantage to convince the Government that an extension of some system, perhaps a modified one, to the whole country is urgently needed.

The ultimate object aimed at is the educational one. It is not proposed that the municipality should interfere between the doctor and his patient, nor, indeed, between the mother and the infant. Circumstances would render this entirely impossible, even were such a scheme ever in contemplation. The mother is, and must remain, the natural guardian of the infant; nothing a municipality can do, nothing the doctor will do, nothing that charity or philanthropy will do, can in any way relieve her from her responsibility, and if through indolence, stupidity, negligence, or other causes, she fails in her watchfulness, then it is a bad look-out for the infant.

Early infantile mortality is forcibly alluded to in the last report of the Registrar-General. I will conclude with one fact which tends to show that, failing any other method of reaching expectant mothers, as, for example, through the midwives, an earlier registration or notification of births is absolutely necessary if the required instruction is to be given in time. There were in 1905 close upon 1,000 deaths registered of infants below one month of age, *i.e.*, at least one fortnight before the fact of the birth need have been registered at all.

Dr. R. Caton, in the absence of Dr. Hope, read the paper.

The Mayor of Huddersfield moved "That notification of all births be given within forty-eight hours to the medical officer of health for the district in which they occur." He explained that this was the clause in the Bill which had so far passed the House of Commons, and it embodied the minimum which they required in this particular connection. He had personally collected information from many foreign countries as to the registration laws, and he hoped to put these in as an appendix to the printed report of his paper. Up to recently he had believed this information was pigeonholed in some of our public departments, but found that there was no such information obtainable. He had therefore written to the various consuls abroad for the facts.

Councillor Hunt (Acton) seconded the resolution, and said that in his district there were some 400 or 500 laundries, employing between 4,000 and 5,000 women. However desirable it might be that married women should not be employed in laundries, he was afraid they would not arrive at that result for some time. Laundresses were not at work on Saturdays and Mondays, and only had a four-day week, and there were a large number of married women employed as such. Their rate of infant mortality was high, exceedingly high, a few years ago, largely, as the sanitary authority believed, because of the employment of married women. Every step had been taken to reduce the mortality. A lady visitor had been appointed, and the rate had fallen by one third. They had reduced the mortality in infants aged between three and twelve months, but they had not reduced the rate in infants between the age of birth and three months. The reason of that was that they could not obtain notification of birth until weeks afterwards. By the time the information had circulated through the registrars at least two months were lost. So they could not get into touch with and educate the mother as she ought to be educated. Hence it was during the first two months that their rate of infant mortality had not decreased, and unless they could obtain this notification of births he was afraid they would not be able to touch the evil. He regarded the clause in the Huddersfield

Bill as essential to progress in the direction desired of saving life now lost.

Mrs. Hauthack, as a midwife, urged the importance of the better education of midwives, who had immense influence over their patients. Midwives were called in a month before the child was born, and so supplied valuable machinery for dealing with this subject of infant mortality. They were in a position to give intimate advice, and advice of the right kind, to mothers before birth with regard to the care of the child. Another consideration was that the midwife was the person who must start the mother's milk, and that was a very difficult thing in poor destitute women. Many of the mothers in the East End of London, among whom she worked, were too poor to afford milk for themselves of any kind, and it was difficult to get them into a fit condition to supply the baby with nourishment. The only means they had was to certify that the patient was in need of nourishment. The husband took the certificate to the relieving officer, and she would have a pint of milk a day and some coals; but at the end of a week that supply stopped. Even when this milk was got for the patient it was difficult often to prevent her giving it to her other starving children. They only stayed with the mother ten days, some of them had as many as 200 babies a month to look after, and when they saw the baby a few weeks or months afterwards they sometimes could not recognise it because of the change which had taken place. She urged that what is required is health visitors to take up the work of the midwife where she leaves it off at the end of the ten days, not before, because it would be difficult to have both midwife and lady visitor going to the patient at the same time.

Councillor W. Fleming Anderson explained that in Glasgow they offered 1*s*. for the notification of any birth within forty-eight hours to the messenger who brought the information. But even the shilling bribe had been a failure. Notification was got from the maternity people, and that was followed up by the visitors. But he submitted that the evidence was that the death-rate of infants under three months is as high to-day as it has ever been, and that state of things could not be remedied unless they obtained notification within forty-eight hours. To the ordinary business man it did seem a peculiar thing that a corpse should be of more value in the eyes of the State than a new-born baby. In Scotland a death had to be notified in three days, yet three weeks were allowed for the notification of a birth. In England it was six weeks; in France it was very much shorter. He thought that they were all satisfied on the point, and ought to follow the magnificent example of Huddersfield. He often felt, with that example before him, that men like the Mayor and Corporation of Huddersfield, even within their own little circle, could get measures of far greater importance than were often got from the big talking-shop across the road.

Dr. Stanley B. Atkinson, B.A. (Stepney Borough Council) said that, owing to the beneficence of a peer of the realm, the Stepney Visitors' Association had been able to send a health visitor into various parts of the borough of Stepney to investigate the condition of children immediately after birth. Certain curious facts had been forthcoming. One was that a goodly percentage of children in Stepney were not registered at all, and many others were not registered until many weeks after the six weeks which the law entails. One reason was the absolute ignorance of the people as to what the law requires, particularly among the aliens, of whom there were many thousands in that district. Another reason was that the people would not register the births in order to escape the Vaccination Acts, and that in certain parts of the district was a more potent argument than anything else against registration of any sort. Then, too, the duty of registration was at present left entirely to the poor mother, so that if there was to be a forty-eight hours limit it would be impracticable without specifying who was to make the registration. The health visitor often discovered births, and in that way was able to correct the statistics given to her for guidance. The person to register should be specified, either the doctor, midwife, or person in attendance, and even then there would be a residuum which would escape through being attended voluntarily by the so-called midwife.

Alderman B. Turner (Batley) moved as an amendment that doctors and midwives should be asked to notify births voluntarily, but this was afterwards withdrawn.

Dr. Newton (Newcastle-on-Tyne), while cordially agreeing as to the advisability of earlier notification, doubted very much whether it would accomplish the object in view. It would be a factor, but it did not strike at the root of the evil. The speeches and papers had practically been an indictment of the ignorance of the British mother. As a medical man and chairman of a sanitary committee of no mean city, he had personal knowledge of the fact that the result of modern education had not been to equip the girl for duties of maternity. The idea above all things was for her to secure a home, but she ought to be educated in the arts which go to make a home. Girls were not educated in that direction and had no knowledge or at least insufficient knowledge of the details of domestic economy to make their homes what they should be. But underlying even this there was the great economical question. If people had not a living wage what was the use of attempting to bring about impossible conditions? Sixty or 70 per cent. of the population were existing on less than a living wage; on the Tyneside there were thousands of families eking out an existence on less than 15*s.* a week. How could such people be expected to carry out the instructions of nurses and health visitors? Give a living wage to every workman in the country, and then they could hopefully adopt other measures.

The motion was then agreed to with one dissentient.

Dr. J. Robert Kaye (West Riding of Yorkshire) said that, having regard to the revelations of the previous day and the strong feeling of the conference on the subject, he would move "That, in view of the information submitted, this conference is of opinion that all still births should be notified within forty-eight hours to the medical officer of health of the district in which they occur, and that no burial shall take place without a medical certificate."

Sir Henry Littlejohn (Edinburgh) formally seconded the motion.

Dr. Stanley B. Atkinson, B.A. (Stepney), suggested that the following words should be added: "by the occupant of the house in which the birth occurs."

Dr. Kaye, replying to a question, said that in the case of midwives, with whom still births mostly occurred, the notification would be to the medical officer of health, and there would be no fee.

The resolution, unamended, was carried unanimously.

INFANT LIFE INSURANCE.

By Councillor W. FLEMING ANDERSON,

Chairman of Health Committee, Glasgow.

In dealing with this big problem of how to save infant life one is compelled to look at the many aspects which presents itself to the student who is earnestly seeking for a solution. The phase of infant life insurance is one which this executive has asked me to introduce to this conference, and I do so in no dogmatic or dictatorial spirit. I am aware that in past years and to-day many hard things have been and are being said with reference to infant insurance, and we know that long ago the Government appointed a Royal Commission to enquire into the question. Child insurance in one form or another has been in vogue for a considerable time, and is attended by many evils.

The question of burial clubs came before Parliament fifty years ago, and that suggested to the directors of certain industrial insurance companies the possibility of transacting business in the insurance of infant life. Such a subject was naturally the cause of much trouble and full of discouragement, but money being in it, it has been worked with success, at least to the insurance companies. In 1874, as the result of the Royal Commission on Friendly Societies, the Statute of Geo. III., which prohibited the insurance of the life of another in which there was no insurable interest was repealed so far as the insurance of children under ten years of age was concerned. The amount was, however, limited to £6 under the age of five years and £10 over five and under ten years. At first some offices declined infantile insurance altogether, limiting their members to being seven years of age, but pressure compelled them after a few years to insure practically from birth.

That the question of insuring infant life lends itself to considerable abuse is evidenced by the fact that some of the best insurance societies exercise great care, and issue as an instruction to their agents that "children may not be proposed for assurance until fourteen days old. A superintendent's report will be required on the lives of twin children under one year, and illegitimate children will not be accepted until they have attained three years," and they further safeguard the interests of their company by another leaflet, in which they say, in dealing with the city of Glasgow at least, "that in consequence of the unsatisfactory character of the business obtainable in portions of Glasgow and district, proposals on the lives of persons residing in certain localities will not be entertained by the company unless the superintendent has seen the proposer and specially reported thereon. Special care has also to be exercised when taking proposals upon the lives of residents in wide closes and in houses to which the sanitary plate is affixed." Then follows a list of eighty streets and closes which the agents are debarred from having anything to do with in the way of life insurance:—

Aird Lane	Bridgegate
Albert Street	Govan

Ann Street	Port Dundas
Argyle Street, No. 285	City
Back Wynd	City
Bell Street	Calton
Bennie's Court	Argyle Street
Bishop Street	Anderston
Bolton Street	Kinning Park
Bridgegate Street	City
Brown Street	Cowcaddens
Buchanan Lane	Calton
Buchanan Court	Broomielaw
Burnside Street, No. 41	Garscube Road
Canal Street	Port Eglinton
Carrick Street, Nos. 48 & 56	Anderston
Charlotte Lane	London Street
Charlotte Place	Hutchesontown
Charlotte Street, No. 20	Port Dundas
Cheapside Street	Anderston
Church Place	Garscube Road
Clyde Street	Anderston
Coalhill Street	Camlachie
Coulter's Lane and Square	Calton
Cowcaddens Street, Nos. 71 & 163	Cowcaddens
Cross Gibson Street	Gallowgate
Cumberland Lane	Hutchesontown
Dempster Street	Cathedral Street
Dyer's Lane	City
Dovehill (Great)	Gallowgate
Garnkirk Street	Port Dundas
Garscube Lane	Cowcaddens
Gibson Street	Gallowgate
Goosedubs Street	Saltmarket
Grace Street	Partick
Greenside Lane	Hutchesontown
High Street, Nos. 1 to 240 inclusive	City
Havannah Street	
King Street	City
King Street	Calton
Kirk Street	Calton
London Lane	London Street
Low Green Street	Saltmarket
Lyon Street	Garscube Road
McAdam's Lane	Garscube Road
McAlpine Street, Nos. 9, 15, & 53	Anderston
McKechnie Street	Calton
McPherson Street	High Street
Main Street	Calton
Margaret's Place	Bridgegate

Maitland Street, Nos. 32 to 70 and 39 to 77 between Stewart St. and Milton St., both sides	
Market Lane and Street	Bridgegate
Marshall Street	Gallowgate
Merchant Lane	Bridgegate
Middleton Street and Place	Townhead
Miller's Place	Saltmarket
Milton Lane	Cowcaddens
Muse Lane	Cowcaddens
Muse Lane	Duke Street
Muirhead Street	Gorbals
New Street	Calton
Newfield Lane	Tradeston
New Wynd	City
Nicholas Street	High Street
Norfolk Lane and Court	Hutchesontown
Old Wynd	City
Orr Street and Lane	Calton
Oxford Lane	Hutchesontown
Paisley Road, West, No. 82	
Parliamentary Road, Nos. 58 & 68	
Paterson Street	Anderston
Perth Street	Anderston
Pettigrew Street	Duke Street
Piccadilly Street	Anderston
Pollock Street, No. 45	South side
Portugal Street and Lane	Hutchesontown
Princes Street	City
Purdon Court	Cowcaddens (160)
Renfrew Court and Lane	Cowcaddens
Richard Street, Nos. 44 to 122 inclusive	Anderston
Robertson Lane	Robertson Street
Rose Street, Nos. 1 to 64 inclusive	Hutchesontown
Rutherford Lane	Cowcaddens
Rutherglen Lane	Hutchesontown
Rutland Lane	
St. Margaret's Place	Bridgegate
St. Ninian Street	Gorbals
Sawfield Place	Cowcaddens
Sawmillfield Street	Cowcaddens
School Wynd	Anderston
Sharp's Lane	Anderston
Shields Place	Kinning Park
Shields Terrace	Kinning Park
Society Row	Cowcaddens
Spring Lane	Hutchesontown
Stewart Street	Cowcaddens

St. James Street, Nos. 222 to 226	Kinning Park
St. James Terrace	Kinning Park
Stirling Street, No. 87	
Stobcross Street, Nos. 1 to 73 inclusive	Anderston
Surrey Street, Nos. 4 to 8 inclusive	Hutchesontown
Surrey Lane	Hutchesontown
Swan Lane	Port Dundas
Swan Street	Port Dundas
Thomson's Lane	Mile End
Trongate, No. 114	City
Union Street and Lane	Calton
Victoria Street	Govan
Villier's Street	Townhead
Wallace Court	Cowcaddens
Walker Street	Partick
Water Street	Port Dundas
Wellington Lane	Hutchesontown
Wigton Street (odd numbers only)	Cowcaddens
William Street	Cowcaddens
Wood Street	Port Dundas

It is a fact known to all that the infantile death rate has not decreased during the last thirty years, and that, generally speaking, while illegitimate children are born of as healthy parents as legitimate children, in the city of Glasgow, the death rate among illegitimate children is exactly double that of legitimate children, and I am sorry to say while that is the case in Glasgow, the general infantile death rate relating to that of England and Wales is very much greater than even the high infantile death rate in Scotland.

[1] LIFE-TABLE FOR SCOTLAND.

Infantile deaths in Scotland during 1891–1900—

Males	91,802
Females	71,960
Total	163,762

∴ Infantile mortality in Scotland, 1891–1900=
Males . 140·03 per 1,000 registered male births.
Females . 115·23 " " female "
∴ General infantile mortality in Scotland, 1891–1900= 127·93 per 1,000 registered male and female births.

[1] From Dr. T. Adam's Life table for Scotland.

The figures for England and Wales were found to be as follows :—

Registered births in England and Wales during 1891–1900—

Males	4,657,846
Females	4,497,365
Total	9,155,211

Infantile deaths in England and Wales during 1891–1900—

Males	781,475
Females	622,244
Total	1,403,719

∴ Infantile mortality in England and Wales, 1891–1900=
Males . 167·77 per 1,000 registered male births.
Females . 138·35 ,, ,, female ,,
∴ General infantile mortality in England and Wales, 1891–1900=153·32 per 1,000 registered male and female births.

It will be seen from the above that the male infantile mortality in England and Wales for the decennium 1891-1900 was 27·74 per 1,000 registered male births higher, and the female infantile mortality 23·12 per 1,000 registered female births higher, than in Scotland. The general infantile mortality in England and Wales for the decennium was 25·39 per 1,000 registered male and female births higher than in Scotland.

The following shows the great importance of the comparatively low infantile mortality in Scotland :—

196,256 = number of infantile deaths that would have occurred in Scotland in 1891–1900, if the same rate had held as in England.
163,762 = actual number of infantile deaths in Scotland, 1891–1900.

∴ 32,494 = number of infantile lives saved in Scotland as compared with England, 1891–1900.
∴ 3,242·4 = mean annual number saved during the first year of life.

Again,

1,403,719 = actual number of infantile deaths in England, 1891–1900.
1,171,226 = number to which infantile deaths would have been reduced in England, 1891–1900, if the same infantile death-rate had held as in Scotland.

∴ 232,493 = number of infantile lives that would have been saved in England, 1891–1900, if the same rate had held as in Scotland.
∴ 23,249·3 = mean annual excess of infantile deaths in England as compared with Scotland.

In dealing with the number of children who are insured, after a good deal of trouble I have been able to ascertain that there is roughly 70 to 75 per cent. of the children of this country insured under ten years of age, so that it is evident that it is not the thriftless and criminal or the lower classes who insure. On the contrary, these are the very classes whose interest in their offspring is so little that they do not and will not pay premiums to provide for a rainy day. Amongst this 70 to 75 per cent. a great portion is composed of the working and artisan classes, the clerk, the warehouseman, the farm labourer, the overlooker, the policeman, the soldier, the sailor, and the small shopkeeper, and in dealing with classes such as these one does not want to speak a single unkind or cruel word.

I have secured a table with the percentage of infant deaths insured in friendly societies, distinguishing the legitimate from the illegitimate child, in certain poor wards of the city of Glasgow for the years 1898 to 1905, a careful perusal of which shows that the illegitimates are only insured to a small extent as compared with the legitimates.

GLASGOW.—PERCENTAGE OF INFANT DEATHS INSURED IN FRIENDLY SOCIETIES, DISTINGUISHING LEGITIMATE AND ILLEGITIMATE, IN CERTAIN WARDS FOR THE YEARS 1898 TO 1905.

MUNICIPAL WARDS.	1898.		1899.		1900.		1901.		1902.		1903.		1904.		1905.	
	Legitimate.	Illegitimate.	Legitimate.	Illegitimate.	Legitimate.	Illegitimate.	Legitimate.	Illegitimate.	Legitimate.	Illegitimate.	Legitimate.	Illegitimate.	Legitimate.	Illegitimate,	Legitimate	Illegitimate.
I. Dalmarnock . .	48·1	11·5	52·6	12·7	50·2	6·3	52·5	12·7	49·5	12·5	54·2	17·2	47·1	15·6	50·4	21·9
II. Calton . . .	33·5	13·2	49·8	14·6	48·8	11·7	50·5	12·6	47·1	11·7	47·4	19·0	50·0	15·1	37·1	18·5
III. Mile-end . .	48·9	12·2	47·5	15·2	46·9	9·4	48·0	17·6	44·3	14·6	48·3	8·1	49·8	15·6	43·9	15·8
IV. Whitevale . .	49·3	14·7	40·0	21·6	40·1	11·6	40·2	20·9	36·3	17·6	47·1	20·8	53·5	8·7	51·3	21·4
VI. Springburn . .	49·8	12·7	42·9	15·2	43·4	17·5	43·1	24·6	40·4	15·7	38·1	15·8	45·6	17·4	69·8	6·3
XII. Broomielaw . .	43·3	5·2	36·0	4·6	35·9	12·9	43·0	12·1	36·2	10·3	39·1	14·2	15·2	—	50·0	—
XVI. Cowcaddens . .	45·0	6·8	43·1	3·4	42·4	7·0	39·0	13·1	37·2	9·5	39·3	11·6	45·3	12·9	39·4	5·0
CITY . .	42·9	11·1	42·3	9·7	42·1	11·1	42·9	12·5	39·9	10·9	42·0	12·7	43·7	10·9	40·7	14·2

I also submit a table giving the births and infantile deaths and the number of children living at the end of the first year in those same wards, distinguishing legitimate from illegitimate, and also a table showing the average infantile death rate per thousand births for the years 1903-4, and also the infantile death rate for the year 1904, distinguishing the legitimate from the illegitimate.

GLASGOW.—BIRTHS AND INFANTILE DEATHS, AND NUMBER OF CHILDREN LIVING AT END OF FIRST YEAR IN SEVERAL WARDS, DISTINGUISHING LEGITIMATE AND ILLEGITIMATE.

Wards.	Births for Second Half of 1903 and First Half of 1904.		Infantile Deaths, 1904.		Number surviving at end of First Year.	
	Legitimate.	Illegitimate.	Legitimate.	Illegitimate.	Legitimate.	Illegitimate.
I. Dalmarnock .	1,993	107	274	32	1,719	75
II. Calton . .	1,186	120	210	33	976	87
III. Mile-end . .	1,654	111	267	32	1,387	79
IV. Whitevale . .	1,032	69	159	23	873	46
XII. Broomielaw .	226	35	33	7	193	28
XIII. Anderston . .	945	55	144	11	801	44
XVI. Cowcaddens .	1,240	149	203	31	1,037	118

GLASGOW.—AVERAGE INFANTILE DEATH-RATE PER THOUSAND BIRTHS FOR THE YEARS 1903—4; ALSO INFANTILE DEATH-RATES FOR THE YEAR 1904, DISTINGUISHING LEGITIMATE AND ILLEGITIMATE CHILDREN.

Wards.	Infantile Death-rate, mean of 1903—4.	Death-rate per 1,000 Births of each class, 1904.	
		Legitimate.	Illegitimate.
I. Dalmarnock	145	137	299
II. Calton	190	177	275
III. Mile-end	162	161	288
IV. Whitevale	155	154	333
XII. Broomielaw . . .	181	146	200
XIII. Anderston	146	152	200
XVI. Cowcaddens . . .	186	164	208

Why this great difference as disclosed in this table, and this is but a reflex of what is going on all over the country, though we know illegitimate children nursed by their own mothers when detained in poorhouses after their confinements does not vary appreciably from the general rate of mortality for all England, and yet what do these statistics point to? There may be pre-natal causes induced by the discovery of the mother's condition, but I feel there is no doubt that the large measure of mortality could be prevented. The existence of the child is in itself a strong incentive to do away with it so long as we wholly blame the mother and see her held up to contempt by society, in addition to bearing her own shame and usually poverty. It is also a disgrace that the putative father when he does contribute, contributes only a fraction of the cost of maintenance, and thus the child has usually to be cared for by an indifferent, if not inhuman nurse, and so the child suffers and dies: the mother is looked on with reproach by her sisters, and the father is not for some reason subject to the social ostracism applied to the mother.

While making these statements and seeking in no way to disparage the thrifty classes in our community who want to insure their children so that they may have a decent burial, it has been forced upon me that there are very many in our community who are not moved by such a tender spirit, but whose care of the living child is so bad that they should be brought to the notice of those who are interested in the prevention of cruelty to children. By the death of these children a sufficient sum is secured which is not spent upon decent interment but upon their own enjoyment, and the cost of the burial has often to be borne by the parish or by the sanitary authorities. It is quite a common thing when a woman has the misfortune to have an illegitimate child, and who depends for her living on her own efforts, to hand over the child to the tender mercies of some woman to nurse for her, and whose sole interest in the child is the small amount of 3*s*. per week or so which she receives for the keeping of the child. In some of our poorer localities I have noticed these babies being cruelly done to death, either by receiving milk or other food quite unsuited for the requirements of the child, kept in a bottle and taken through abominably dirty and evil-smelling tubes, and on attempting to remonstrate with them for the treatment which the helpless sufferer was getting, I was coolly informed that it was more trouble than it was all worth, and she did not see why she should not get her insurance like other people.

If a dog howls all turn and look sympathetically at it, and would resent any cruelty being offered it, but when a baby cries it is so often unheeded, and yet the same feeling of pain causes the same utterance in each. These babies are often never seen by a doctor until, to save their skin, the nurse sends for one when too late in order to get a certificate, without which it is difficult to get their insurance money.

I think the present system of infant insurance whereby a person may receive a sum of money on the death of their offspring is altogether wrong. The custodier of the child should rather, in my opinion, receive some reward if the child lives instead of compensation for its early death. It is a most difficult thing to bring home criminal negligence to this class of people. If they gave an irritant poison at once they would bring themselves within the meshes of the law, but it is well enough known that diarrhœa can be induced without very much trouble, and it is no uncommon thing for the weakly child in forty-eight hours to be carried off with what we at the present time recognise or describe as an act of God.

The proportion of children insured who are subjected to this treatment and by whose death a small payment is made is not easily discovered, but I think the time has now come, in view of the ravages of death upon the infant population and specially upon the illegitimate infant population, that if children must die, then their death should be a distinct personal loss to the parents or nurse, as each death is a loss to the State.

One might think my words too strong in dealing with this subject, but surely when sanitary science has so reduced our general death rate and not in the slightest improved our infant death rate, in spite of all our legislation, one can be forgiven if they should feel their indignation bubbling over in presence of a sympathetic audience.

Dr. Jones, in a magnificent paper, has given statistics which are simply appalling, and yet too seldom do we find any punishment following the evil doers.

In dealing with cruelty to children the Society for the Prevention of Cruelty to Children in eight years had 25,349 complaints, and of these 20,443 were true, no less than 13,411 being due to neglect and starvation, and the victims were young, many of them babies. We must take it that a large portion of these were wilfully maltreated, and I think the burden of proof that it was not wilful should lie with the guardian, and not with the prosecutor, whose little client cannot articulate its wrongs, and yet I read from an assurance society paper *that amongst the children concerned in cruelty cases only* 50 *per cent. are insured.* If children come to be a burden, or are in the way, why should persistent neglect and actual ill-usage be rewarded by pecuniary advantage instead of by the punishment of a virtuous judge.

There are, roughly, forty thousand illegitimate children born each year. In some cities the death rate is three-fifths of those born, while in all the death rate is double that of the ordinary legitimate infant death rate.

Of inquests held on 3,979 infants under one year, 31 per cent. of these were on illegitimates, yet illegitimates form less than 5 per cent. of the total birth rate.

I would therefore suggest that infant life assurance should, if allowed at all, be much more closely supervised.

The company and insurer both insure for profit and the moment it becomes unprofitable to the company, they will find probably philanthropic reasons for refusing such business.

It is shocking that by payment of 1*s*. 3*d*. or 2*s*. 4*d*. one is entitled to 30*s*. after thirteen weeks or £3 after six months on the death of the child. The signing of the proposal by one parent is wrong, and the mere declaration of the agent that the child is healthy is so absurd as need no comment, as even agents don't like to pass on business to some other less scrupulous opponent; the claim is signed by parent, and a certificate from registrar and identity certificate by some one or any who knew the child.

This is altogether inadequate.

The mere feeling that induces one person to become a baby farmer in a lesser degree, induces another to insure and I suggest that the disease is meantime so virulent that nothing else but the abolition of any payment for deaths under twelve months will be adequate.

INFANTILE MORTALITY AND LIFE INSURANCE.

By FREDERICK SCHOOLING,

Actuary of the Prudential Assurance Company, and one of the Vice-Presidents of the Institute of Actuaries.

In the short space of time at my disposal it is of course quite impossible for me to deal with the question in much detail, and I therefore propose to shortly refer to three or four points in connection with the assurance of children's lives which appear to me to be of the most importance.

The assurance of children's lives is regulated by clauses 62 to 67 of the Friendly Societies Act of 1896, and all industrial assurance companies or friendly societies, whether registered or unregistered, come under these regulations.

The amount payable on the death of a child under five years of age is limited to £6, and under ten years of age to £10. In `practice, however, a graduated scale of payments, increasing with the age and duration of the policy, is always adopted, commencing with a sum of 30*s.* for age 1 and rising to £10 at age 10; if death occurs within three months of the policy being effected no amount is payable. As no child can be proposed for insurance until fourteen days old, no money can be received until a child is four months old, and, as the speaker on the previous paper pointed out, the great mortality is in the first few weeks of a child's life. Illegitimate children are not accepted until they are three years of age.

In the event of a death occurring, a certificate has to be obtained from the registrar in accordance with the provisions of the Friendly Societies Act, the parent has to fill up a form, the agent has to give a certificate, and someone who knew the child has to give a certificate of identity. It will thus be seen that there are four people besides the parent, namely, the doctor, the registrar, the agent, and the person signing the certificate of identity, who must have full knowledge of everything in connection with the death before a claim can be paid. It may be as well to mention that although there have been numerous inquiries and new enactments on the subject of children's assurance, yet the law limiting the amount to be paid on the death of a child has remained unaltered for the last fifty years, and it should be noted that it is during this period that the practice of child life assurance has grown until it has become perfectly general amongst the industrial classes.

In considering this question of child life assurance there are two facts which stand out with very great prominence. The first is that the practice is universal amongst the industrial classes, and the second is that the death rates have improved during the last fifty years in the group of ages 0—10 in a very marked manner, and yet it is during this very period that infantile assurance has become general. Taking the first point, in the industrial branch of the Prudential alone there were at the end of last year over 2,530,000 children insured. The number insured in all other industrial assurance companies and friendly societies is at least as great, probably more. It should be noted that only one policy is allowed on the same life, so that in speaking about infantile business policies and lives are the same thing.

Although of course the industrial classes themselves are cognizant of the fact that it is the general custom to insure the lives of children, there is still very great ignorance on this point amongst the upper and middle classes. It has been well said that "one half of the world has no idea of how the other half lives"; this is very true as regards industrial assurance in the United Kingdom. As a result of this ignorance we find people astonished when in the case of an accidental death of a child the fact that it is insured or has been insured is brought to light. Instead of being astonished because it was insured, the astonishment should really be expressed if it were not insured.

It will be seen from the Sixty-seventh Report of the Registrar-General, on p. 122, that the annual death rate for male infants between the ages of 0 and 4 was fifty years ago about 72 per 1,000, whereas for the five years ending 1900 (the last quinquennial period recorded) the rate was 62 per 1,000; for the group of ages 5—9 fifty years ago the rate was 8½ per 1,000; now it is a little over 4 per 1,000. Females show the same results. Where fifty years ago for the group of ages 0—4 the rate per 1,000 was 63, now it is 52. For the group of ages 5—9 it was 8 per 1,000; now it is 4 per 1,000.

In giving consideration to the improvement of the death rates amongst children in the groups of ages 0—4 and 5—9, it is, of course, admitted that the cause of the improvement is better sanitation and increased knowledge on the part of the parents. If, however, there had been any adverse influence at work during the last fifty years, it would have prevented such a very marked improvement from taking place. It is not claimed that insurance is the cause of this improvement, but it is claimed that the prevalence of the habit of insuring children has not in any way stopped the improvement in the death rates.

An article has been going round the provincial papers in which the figures of the Registrar-General have been used to show that the mothers of the present day are more careful for the welfare of their children than their own mothers or grandmothers were. This article does not give any credit to the fact that mothers of the present day are probably better housed, and their houses better drained, than were those of mothers of previous generations.

If we turn to a comparison of the rates of mortality amongst insured children with the rates of mortality for the whole of the country, we find it all in favour of the assured lives, and the following table, which was used by Mr. Dewey, the General Manager of the Prudential, in his evidence before the Committee of the House of Lords, well illustrates this point.

The Prudential rate is obtained from the experience of ten years (1879–88). The number of policies passing under observation during that period was 9,236,920.

Ages.	Annual Rate of Mortality per 1,000.		
	Prudential.	Dr. Farr's English Life Table No. 3 (from Census Returns).	Carlisle Table.
0—1[1]	99·46	165·59	153·90
1—2	63·24	65·59	80·61
2—3	32·39	36·14	64·92
3—4	18·62	24·33	37·94
4—5	13·48	17·92	28·72
5—6	10·03	13·53	17·80
6—7	7·61	10·75	12·28
7—8	5·72	9·16	8·79
8—9	4·89	7·69	6·58
9—10	4·28	6·57	5·08

I also append a table giving the actual and expected deaths for ages 0—10 during the last ten years as experienced by the Prudential Assurance Company, the expected deaths being those according to the English life table No. 3 :—

EXPECTED AND ACTUAL DEATHS (AGES 0—10), MALES AND FEMALES.

Year.	Deaths.	Expected Deaths.	Year.
1896	59,051	73,846	1896
1897	58,801	74,339	1897
1898	59,620	73,799	1898
1899	58,502	73,810	1899
1900	56,062	74,146	1900
1901	53,076	73,247	1901
1902	47,566	72,223	1902
1903	43,773	71,609	1903
1904	48,005	70,483	1904
1905	40,452	69,190	1905
Total .	524,908	726,692	Total.

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[1] For the first year after birth the Prudential figures present a too favourable comparison from the fact of the company having no experience for the first two weeks of life. There are no means of making an absolutely accurate comparison, but eliminating the first month's deaths from Dr. Farr's English life table (a severe comparison), the rate is reduced from 165 per 1,000 to 108, being still 9 per 1,000 in excess of the Prudential experience.

All these facts contradict the statement which is sometimes made that children are neglected and allowed to die for the sake of insurance money. Statements such as this have generally been promulgated by well-meaning people entirely ignorant of the whole subject. Letters to the newspapers have even been published in which the possible sum assured on one child's life is mentioned as being £50 or £100, the writers being altogether unaware of the fact that there is such a thing as a legal limit of £6.

There have been several parliamentary inquiries into this subject. One of the first, if not the first, was that of the Select Committee of the House of Commons on the Friendly Societies Bill in 1854, where the Committee reported on the subject of child insurance as follows:—

"Your Committee draw from the evidence adduced before them this conclusion, that the instances of child murder where the motive of the criminal has been to obtain money from a burial society are so few as by no means to impose upon Parliament an obligation, for the sake of public morality, to legislate specially with a view to the prevention of that crime.

"Your Committee refer to the evidence to show that no sufficient grounds exist for the general suspicion which seems to have been entertained on this subject. They believe that suspicion to have been almost entirely founded on the few cases brought to trial, exaggerated by the horror with which the idea of a crime so heinous would naturally be regarded."

The Chief Registrar of Friendly Societies of England and Wales, in his report for the year 1894, says:—

"Upon considering the evidence adduced before all these committees and the Friendly Society Commissioners, I do not think that it has materially altered the conclusion at which the Committee of 1854 arrived. During the forty years since that date very many millions of children of the working classes have been insured in burial societies or industrial assurance companies, and the cases in which malpractices have been proved are exceedingly few. Child murder for burial money does not prevail to an extent which calls for legislative interference any more in 1894 than in 1854."

It is becoming recognised that the real danger to infant life is improper feeding more than anything else, and it is satisfactory to know that the spreading of this knowledge is apparently having some effect.

In the latest return issued by the Registrar-General of England and Wales, it is stated that the rate of mortality for the year 1905 "among infants under one year of age to 1,000 registered births was 128, which is 18 per 1,000 below the rate in 1904, and lower than the rate in any other year on record," showing that the improvement in infantile death rates is still being continued, and that Bailie W. F. Anderson is wrong in assuming that there is no improvement in the death rate for under one year of age.

In the Howard Medical Prize Essay on the subject of "The Perils and Protection of Infant Life," by Dr. Hugh R. Jones, this point of proper food for infants is strongly insisted upon, and there are now established in the United Kingdom societies who make it their business to disseminate useful and practical hints as to the rearing of children. The insurance of children goes hand in hand with the spread of such knowledge, for both appeal to the thrifty and provident parent, and it is the dissolute and improvident father or mother who neither makes provision for funeral expenses in the event of the death of his child nor takes any heed as to what it is fed upon.

Dr. Barwise regretted that Mr. Schooling's figures had not been printed in advance, so that they could have had that attention which figures from him deserved. But he wished to point out that the groups Mr. Schooling compared were not comparable groups. The lives of the children dealt with were selected lives;

the children uninsured were those whom the insurance companies would not take. Against those figures could be put the experience of any medical man practising in the slums of any large city. He quoted a case of a mother who, although she had no food in the house, was able to raise enough money on the fact that her child was insured to keep herself drunk for a week. Mr. Schooling said that they ought to be surprised if 80 per cent. of the children were not insured. But what was the object of insurance? To give a child a decent burial without the parents being forced to go to the parish. The whole difficulty would be got over if the insurance companies would make some arrangement—he had himself suggested this before a parliamentary committee fifteen years ago—by which they could conduct the funerals without any money passing whatever.

Dr. Moore (Huddersfield) pointed out that as a conference they were concerned with infants, and by the term infants was meant children less than one year old. The figures given by Mr. Schooling were not confined to children of that age period, and therefore to some extent they lost interest for the conference. He could not, however, refrain from expressing surprise that a gentleman of Mr. Schooling's position, and an actuary, should have made a comparison between the substantial reduction which had taken place, which they all knew to have taken place, in deaths at ages from 0 to 10 and infant life assurance. That was not the same thing at all. He thought that the actuary of an insurance company should not have made such a comparison.

Councillor W. Fleming Anderson (Glasgow) moved, but in no dogmatic spirit, the following resolution: "That in the opinion of this conference the question of the insurance of infant lives under twelve months is one demanding serious consideration, and with a view to securing reliable information the Government should be asked to appoint a departmental committee of inquiry upon the whole subject." Dr. Moore had answered Mr. Schooling's point, for the conference was strictly confined to the problem of children under twelve months. If Mr. Schooling's figures had been taken simply with reference to twelve months instead of up to ten years, he was sure that the proposition that there should be no pecuniary gain received from the death of infants would have been demonstrated up to the hilt.

Dr. J. M. Rhodes, J.P. (Chorlton Board of Guardians), formally seconded the resolution.

Mr. Schooling, by way of explanation, said that the answer was very simple. He had been told that the subject was one of infant life and insurance—that was the title of his paper—he was not told that it was confined to children of one year of age. He therefore assumed that the definition in the Friendly Societies Act would be followed. He did not think he was very wide of the mark in so assuming, for it was a natural inference to take that the definition in the Friendly Societies Act was the one which would be followed.

Dr. Barwise again urged that the opinion should be expressed that the sole object of child insurance should be burial.

Mr. Noel A. Humphrey (Registrar-General's Office) said he was very pleased to have the opportunity of saying, as one who had had a long experience in the General Registry Office, what his experience was of a striking evil affecting infant mortality. Mr. Schooling represented only one industrial insurance office, but there were many. There was a degree of touting for insurance going on all over the country now which was a crying shame. It was one of the greatest evils of the present day. It was a system of gambling; it was not all thrift, as they were sometimes told, but a great portion of it was unmitigated gambling in life. His experience in the Registrar-General's office was derived from many thousands of registrars all over the country. He was told that the touting was so indecent that women were actually approached to insure the lives of their infants when they were expecting confinement, and that their names were taken down. Mr. Schooling said that he takes precautions with his agents. He is very good, but how could he, with 15,000 agents all over the country, know what goes on? It is a profitable business, it is making huge sums of money for directors and shareholders, but the system was an unmitigated evil. Feeling that very strongly, he was delighted to have an opportunity of expressing his opinion on the subject. The instruction that no child was to be insured under fourteen days was an absurdity. It was not carried out. It was a very proper rule to make, but there were many different offices. The Prudential was only one. There was much touting in trying to get the business away from the good offices, and all the precautions Mr. Schooling had mentioned were futile. He could not carry them out, and if the Prudential agents did, other agents did not.

Dr. Barwise proposed as an amendment the addition of the following words to the resolution, "and that insurance companies should pay for the funerals of children direct to the undertakers instead of the money passing through the parents." The reason for making the addition was that he was against asking the Government to appoint another commission. They had already got plenty to inquire into, and this particular subject had already been inquired into several times by select committees. The whole difficulty would be got over if his suggestion were put into force.

Dr. Mearns Fraser, giving his experience in Portsmouth, said that he had been of opinion that infant insurance had a great deal to do with infant mortality. But he collected figures carefully for a year and came to the conclusion that it had nothing whatever to do with the rate of mortality. He had entered into the inquiry with the conviction that infant life insurance was, as some gentlemen on the platform had described it, a gamble, but after investigation he came to the conclusion that that view of the matter was an absurdity. Infant insurance could not have that effect, because it would mean that the insurance companies would lose money. They could not get away from the fact that both the insurers and the insured could not make money by the transaction at the same time. Bailie Anderson's paper was principally devoted to the difference between the deaths of legitimate and illegitimate children, and did not contain sufficient facts to warrant the conference in asking the Government to appoint a departmental committee or a royal commission on the subject.

Dr. S. Davies (Woolwich) said that the amendment took up a position which a good many of them could support. They felt that it was not a desirable thing to shelve the matter by shunting it on to the Government of the day. They wanted the conference to express an opinion as to what the remedy was. But he was in full agreement with the representative of Portsmouth that infant life insurance was not a serious factor in infant mortality. Unless they were prepared to say that infants should be buried at the public expense, infant life insurance was necessary. The only thing to consider was as to what steps were necessary, or desirable, or possible, to prevent what no doubt occasionally happened, the additional inducement to do a child to death by the prospect of having the insurance money paid afterwards. Now that difficulty would be fully met by Dr. Barwise's proposition that the insurance money should not be paid to the parents or guardians directly, but only sufficient paid to cover the funeral expenses. Such a step would probably be in the interests of the insurance companies themselves. Of course, it could be understood that there might be practical difficulties in the way, but there would be no harm in making the recommendation to the insurance companies for their consideration.

Provost Christie (Falkirk) interposed for the purpose of pointing out the fallacy contained in Dr. Mearns Fraser's argument, that the insurers and the companies could not both make money at the same time. It depended entirely upon the extent of infant mortality and insurance. It was surely possible that a large amount of mortality might arise from this cause, and yet for the business of insurance to be a profitable one to companies. He particularly desired to thank Mr. Anderson for his excellent paper, and heartily associated himself with his fellow-countrymen in trying to combat what he regarded as a fallacious argument. The motion after all was only for an inquiry by the proper authorities who were in a position to get hold of reliable information.

Dr. Scurfield desired to express the opinion that it was not right that there should be a profit made out of the deaths of children under one year of age, and also wished to emphasise the point made by the last speaker. As an illustration of that point, he said that they all knew that the bookmakers were the class which made the money from betting, but that did not prevent individual gamblers from making a *coup* every now and then. The argument that the working classes did not make a good thing out of insuring their babies was an argument which would also apply to gambling. But, as was well known, it did not stop gambling, and the two cases were comparable.

It having been agreed to take Dr. Barwise's motion separately, the resolution as proposed by Mr. Anderson was put and carried *nem. con.*

DR. BARWISE then moved "That, in the opinion of this conference, insurance companies should pay for the funerals of children direct to the undertakers instead of the money passing through the parents."

THE LORD MAYOR OF YORK formally seconded.

ALDERMAN B. TURNER (Batley), as a layman and not a doctor, denied the truth of the allegation that working class people gambled in the lives of their infants. The whole of the thirty shillings gained in the first year was not worth the gamble, and the charge was a serious one to bring against the working classes that for such a small sum of money they would seek to compass the deaths of their infants. Dr. Barwise's motion was also based on a fallacy. A great amount of wealth was extracted from the poor people by the insurance companies, and yet it was proposed to give those companies a still further advantage by enabling them to contract cheaply for the burial of children.

DR. MCCAW (Belfast), as a delegate coming from Ireland, said that in Belfast they were quite alive to the great abuses which obtained under the heading of infant life assurance. It seemed to him to be very strange that it should be possible to insure an infant life without any examination of any kind whatever, while an adult could not get £100 on his life without a proper medical examination. That was a great abuse, and he had sufficient confidence in the medical profession to say that, if parents were compelled to pass their children before a doctor prior to insuring them, the abuse would be greatly lessened.

MISS LOVIBOND said that as an inspector she had made many inquiries into this question of infant life assurance. She could support the statement that children were insured as a matter of course; in fact, children were insured more naturally than they were vaccinated. But the largest mortality was increasingly among infants under three months of age, and her experience was that insurance companies did not pay benefits for children who died under three months of age. They might pay benefits on six months, but even that was a concession. With the Prudential Company she thought that this was quite a concession, and parents rarely got the thirty shillings under the twelve months. With regard to the proposal to pay the funeral expenses only, a rather extraordinary suggestion was made by one speaker that mothers obtained the insurance money and then spent it on themselves, going to the parish for the burial of the baby. Her experience of boards of guardians was that in such a case they would come down pretty quickly on the parents for that money. If the child was insured why should not the guardians claim the money for the expenses of burial? The suggestion that the funeral expenses only should be paid would result in a great injustice, for the reason that when a child under twelve months died there were very often other sick children in the house, or it might be a time of epidemic, and the spare insurance money often went to provide nourishments for the other sick members of the family. Extra nourishment was not given through the Poor Law without a man losing his franchise. She thought it was doing an injustice to hard-working parents to say that the insurance of their children was going to lessen their care of the children.

Mr. Day supported the view of the last speaker. He felt that it was throwing a severe slight on the working classes to suggest that they insured their children only for the purpose of getting the money. All would be agreed that occasionally such cases might occur. There were bad people in every class of society, but he believed that the great majority of the poor insured their children in order to avoid a pauper burial. He knew of cases in which the parents had had to beg for the money with which to bury their children apart from the parish, and guardians could at all times avoid the difficulty by making the cost of the burial a returnable loan on the part of the parents. The Local Government Board might usefully call attention to this method of helping afflicted families, and personally he thought they could safely leave this question of insurance mainly to the poor themselves, whose natural feelings would carry them through.

The Mayor of Huddersfield thought that, as the conference had passed the resolution proposed by Mr. Anderson, it would be unwise to go any further with the subject. He hoped the motion before the conference would be withdrawn.

Councillor W. Fleming Anderson also asked Dr. Barwise to withdraw his motion. He did not wish to cast any reflection on the working classes at all, but at the same time, as chairman of a public health committee, he knew what was going on amongst certain sections. It seemed to him that the conference had altogether forgotten what had been said the previous day by Dr. Scurfield in connection with what was known to be going on in another branch of the subject. If insurance companies could take money from the parents every year, they could surely trust the parents to give the dead children a decent burial. The conference was dealing with the class under twelve months of age, and the motion, if carried, would convey a certain amount of reflection. As to what Dr. Mearns Fraser had said, as a business man he (the speaker) knew a little about life assurance. He knew that lapsed policies were a pretty helpful source of revenue to insurance companies.

Mr. Schooling pointed out, in reply to Mr. Anderson's remark, that the lapsed policy on the life of an infant was a direct loss to insurance companies. That was proved before a royal commission.

Dr. Barwise thought that the suggestion contained in the motion would be a convenience, and not a detriment, to insurance companies. All they would have to do would be to enter into contracts with undertakers in various parts of the country. He had been asked not to put his motion in the form of an amendment to Mr. Anderson's motion, so that the latter could be carried. He agreed to that course on the understanding that his motion would be put afterwards, and therefore he had to adhere to it.

Dr. Barwise's motion was then put and declared lost, only twenty-two hands being held up in its favour.

INFANT MORTALITY AND THE EMPLOYMENT OF MARRIED WOMEN IN FACTORY LABOUR BEFORE AND AFTER CONFINEMENT.

By GEORGE REID, M.D., D.P.H.,

County Medical Officer of Health, Staffordshire.

There is no need to emphasise the importance of that phase of the infant mortality question the discussion on which I have the honour to introduce; neither, before an audience such as this, is it necessary to occupy much time in proving what must be patent to all who have studied the question. Endless proof is available of the injury to infant life arising from the unrestricted practice of mothers engaging in factory labour, but as it happens that I have had somewhat exceptional opportunities of gauging the effect of this practice in a large manufacturing county, a short account of certain special inquiries I have made regarding the question may be of some interest.

The artisan population of Staffordshire is grouped together in two large centres in the extreme north and south of the county respectively, the intervening area being rural in character. From the point of view of health conditions the two grouped populations, north and south, may be said to be identical, and in both cases the general influences which operate in causing a high infant mortality prevail largely and to an equal extent. In one respect, however, there is a marked difference in the two populations arising from the special industries carried on in the two centres, the workers in the north being mostly potters, while those in the south are miners and iron workers; therefore in the north a very large number of women, both married and single, are engaged in factory labour, whereas in the south the trades carried on afford practically no employment for women.

Some sixteen years ago, when my public health work in Staffordshire began, I was much struck with the great excess in the infant mortality rates of the northern compared with those of the southern artisan towns, high though the latter were; and this led me to make special inquiry into the question, with the result that differing sanitary and general hygienic conditions in the two populations could not be advanced as an explanation. The conclusion then presented itself that in the married women labour question the key to the situation might be found.

With the view of more stringently testing the accuracy of this hypothesis, the towns, irrespective of geographical position in the county, were as far as possible specially classified into three groups according to the proportion of married women workers in each, and it was found that the infant mortality rates varied in direct proportion to the number of such workers. From year to year since then these figures have similarly been classified, and the results have unfailingly, and in a very striking manner, supported the conclusion originally arrived at. Whether, from the operation of other causes, the general infant mortality happened to be high or low from year to year, practically the same proportionate increase or decrease, as the case may be, in the three groups of towns was maintained.

In classifying the towns into groups in the first instance, I obtained the necessary information as to the relative number of married women workers from district medical officers of health and manufacturers, but, while all care was taken to ensure accuracy, in the absence of any available figures the classification was merely approximately correct. In 1902, however, the Registrar-General was good enough to supply me with certain figures, specially extracted from the 1901 census returns, showing the number of married and widowed females engaged in specified occupations in each of the towns in question, together with the number of females living at various ages. From these figures I estimated, in the case of each artisan town, the percentage of married and widowed females engaged in work involving absence from home during the day per total females between the ages of eighteen to fifty, but I had no data to allow of the number of married as distinct from widowed females being arrived at. Also, in order to make use of the Staffordshire infant mortality returns which were available for twenty-four years, I was obliged to assume that the number of married and widowed out-workers to the female population within the specified age limit was the same throughout the whole period as in the last census year, an assumption which, I think, is justified by the fact that no change has taken place in the special trades carried on in the various towns during that period.

On the new basis I have reclassified the towns (artisan only) into three groups, placing in the first group those in which the proportion of married and widowed females engaged in work away from home to total females between eighteen and fifty reached and exceeded 12 per cent., in the second group those towns in which the proportion was under 12 per cent. and over 6 per cent., and in the third group those in which the proportion was under 6 per cent.

In the following table the rates in the different groups of towns are given :—

Class according to Percentage of Married and Widowed Workers to Female Population between Eighteen and Fifty Years.	Number of Towns.	Total Population, 1901 Census.	Deaths of Infants under One Year per 1,000 Registered Births.		
			1881 to 1890.	1891 to 1900.	1901 to 1904.
I.—12 per cent. and over .	5	132,299	195	212	193
II.—Under 12 per cent. and over 6 per cent. . .	13	263,868	165	175	156
III.—Under 6 per cent. . .	8	131,508	156	168	149

As a matter of fact, the more accurate method of classifying the towns as compared with the classification previously adopted has not caused any appreciable alteration in the relative mortality in the three groups, and I submit that the figures bear out my contention that, in the absence of any other apparent reason, the excessive mortality in the first group compared with the second and third, and in the second compared with the third, is attributable to the nature of the trades carried on, as affecting the facilities for the employment of women away from home, and, as a consequence, the proportion of wholly artificially fed to entirely or partially breast-fed infants.

There is another aspect of the question, however, apart from that which more directly results from mothers neglecting their home duties after their children are born, and that is the effect, as regards the viability of the unborn, of mothers engaging in other than domestic work up to the time of their confinements.

While all must realise how undesirable this practice is, the extent of the injury directly attributable to it cannot very readily be demonstrated by figures. In time, however, I think we shall have data available in connection with the administration of the Midwives Act which may throw some light on the question. This Act has only been in practical operation for a little over twelve months, and it has taken some time to get the machinery into efficient working order; nevertheless, through the energy of two inspectors working under the Act in Staffordshire, I am able, even at this early date, to submit certain figures which—having regard to the difference between the north and the south in the matter of women employment—are very significant.

Under the rules of the Central Midwives' Board, certificated midwives attending abnormal cases have to call in medical assistance and notify the fact to the local supervising authority, and they have also to notify all still-births occurring in their practice. This being the case, allowing that working in a factory up to the date of her confinement is detrimental to the mother, one would expect, other things being equal, that the abnormalities and the still-births in the pottery towns would exceed those in other artisan towns where the nature of the work does not afford employment for women. For the purpose of inspection under the Act the county is divided into northern and southern areas, the former comprising the populous pottery towns, and the latter the equally populous towns inhabited by miners and iron workers. Up to the present time the following are the relative figures for the two areas as regards notifications received of (a) abnormalities and (b) still-births in the practice of registered midwives per 1,000 births registered:—

	Abnormalities.	Still-births.
North	15·0	9·4
South	6·0	3·2

The figures appear small in both cases, but it must be remembered that the rates are calculated upon the total births, whereas only a proportion of these were attended by registered midwives, many having been attended by medical men, or by unregistered midwives who are not yet entirely barred from work. It is also important to note that, although the records cover a period of twelve months, the number of notifications sent in was much smaller than it should have been owing to ignorance on the part of the midwives in the first instance regarding the rules to be observed. Again, included in the areas covered by the returns in this case are the rural districts and one or two small non-artisan towns. All these disturbing circumstances, however, were equally operative in both areas, and the figures, so far as they represent the position, may be said to be comparable. When the Act has been longer in operation, and the midwives become better informed regarding the rules, the number of notifications sent in will no doubt greatly increase, and in time further and more reliable data for comparison will be obtainable.

So much for the effect of the practice of married women working in factories upon the infant mortality. I would point out, however, that the damage done cannot entirely be measured by mortality figures, for these take no account of the impaired vitality of the infants who manage to survive to swell the ranks of the degenerate.

If, then, the injury is as great as we believe it to be—and this can hardly be disputed, having regard to the evidence adduced in endless official reports, as well as the findings of special commissions—one is inclined to ask, Why should it still be necessary to agitate for the adoption of remedial measures? Surely public opinion is now sufficiently ripe for legislative interference, especially in view of the fact that the State already concerns itself regarding the conditions of employment in trades which are detrimental to the health of the workers. But if humanitarian arguments alone do not afford sufficient incentive for action, will not the less unselfish desire to counteract the effect of the diminishing birth rate serve as a more potent argument, having regard to national prosperity?

But, convinced though we may be of the need for State interference, for many reasons it is not easy to make a practical suggestion regarding the form it shall take. Clearly the efficient remedy would be to prevent married women from working in factories or away from home unless they are in a position to show that necessity compels them to do so. Such a claim would with reason be frequently advanced, but I am confident that in the majority of cases there is no real need for married women at the child-bearing age to engage in work away from home, and, if this be so, enforced restraint would merely result in a smaller sum per week being available for the husbands' indulgence, a result which in itself is much to be desired.

In this, as in most matters, however, we shall probably have to be satisfied in the first instance with less than we know to be desirable. The restriction now imposed by law of one month's abstention from work after her confinement is advantageous to the mother, but it does not materially benefit the child. If, however, the restriction extended to three months, the probability is that the mother would suckle her child during that time, and thus the most precarious period of the infant's life would be tided over, and the chances of subsequent survival would be considerably enhanced.

How to prevent mothers from working previous to their confinements is a more difficult matter, and to attempt to enforce any specific restriction would, for obvious reasons, be found to be impracticable. On the other hand, there is no reason why the need should not be recognised and provided for, it being left to the factory medical officer to determine the time in each case when pregnant women shall give up work.

Miss Sharples (Chief Lady Sanitary Inspector, Leeds): While fully recognising the need for suitable environment and protection for married women, so that they may devote themselves to the care of their homes and children, I think we must look very carefully before enforcing further legal restrictions. My own experience is that the great majority of married women who work outside their own homes do so not from choice, but from necessity; and when we realise what wage-earning means to a married woman, we wonder that any preference for it exists at all, for, in addition to the double burden of child-bearing and wage-earning, the time spent by the working man in amusements and recreation must be spent by her in trying to cope with the difficulties of housework, the washtub, and the kitchen oven. I have found, so far as Leeds is concerned, that most of the cases come under the headings 1 and 2 given by Miss Anderson in her statement of the causes of the employment of married women (Appendix V., Report on Physical Deterioration)—(1) death of the father, or lack of employment, or insufficiency of the father's wage; (2) desertion by the father. I have reason to think that the women sometimes work for short periods in order to meet some special domestic crisis, such as the payment of expenses incurred during the illness of a child. There is also another reason—the disinclination of the father to work and the selfish spending of an undue proportion of the family income on his own pleasures. I do not think that the reformation of this kind of man will be brought about by debarring his wife from the more skilled and better paid occupations. The saddest cases that I have known have been those where the wife toiled at a washtub from morning till night, tramped miles through all weathers with a hawker's basket, or toiled day and night in her own house at tailors' finishing at a wage of about 1¼*d.* an hour. I am assured that such cases can be dealt with under the Act for the Prevention of Cruelty to Children. This being so, I think it is a pity that this power is not used more often. In considering the desirability of the legal exclusion of married women from industrial occupations, especially in towns where the staple industries are those in which women are chiefly employed, we must face the question whether a difficulty placed in the way of marriage may not lead to serious social and moral complications.

The figures given in the table are the result of an investigation into the deaths of children under two years, instituted by Dr. Cameron four years ago in a special district in Leeds, and also of an inquiry made on the receipt of the notification of each birth in the same district. This was begun in January, 1905. The figures are generally too small to be useful, but they show, I think, that factors other than the employment of married women must be accountable for the high infant death rate in this district, the mortality of children of working and non-working mothers being relatively 17·2 and 17·3. It will be noticed that of the fifty-nine mothers working within a month before or after confinement, sixteen were employed in factories and workshops, and of these, ten depended in all probability on their daily work for their daily bread, nine being unmarried and one deserted. In making these inquiries the inspector has found that when she remonstrates with the mothers for remaining too long at work and returning too soon she is met by the answer, "Well, we must live." The women have also repeatedly admitted that a change of employer was deliberately made in order to evade the statutory month's rest. To prolong this period would, I think, only lead to more evasion unless safeguarded very carefully. I also feel that the forced exclusion of expectant mothers from industrial work would present very great practical difficulties unless some form of assisted insurance could be established. That some provision enabling these women to have mental and physical rest before and after confinement, with skilled attention and care at the time, would be attended by the best results so far as the children are concerned, is shown by the account of the work in this direction done at Villiers-le-Duc. How some of the poor women continue to live during their time of difficulty can only be explained by that charity of the poor towards the poor which is the result of a real and personal knowledge of privation and hunger, or by taking into account a system of credit which means an accumulation of debt and the resulting increased need for further efforts on the part of the mother as soon as it is possible for her to return to work. I feel that I cannot speak too strongly of the benefit that, I believe, would be derived from the more general appointment of suitable women as overseers and matrons in work-places where women and girls are employed.

INFANTILE MORTALITY INVESTIGATION.—SOUTH-EAST REGISTRATION DISTRICT, LEEDS.

Births notified during the year 1905	1,243
Deaths among these infants before the end of April, 1906	213

Occupation of mothers.

Factory and workshop	128	23	deaths	18.0
Charring and cleaning	40	3	"	7.5
Rag sorting	28	11	"	39·3
Other outside employments	47	5	"	10·6
All outside employments	243	42	"	17·3
Housework only	975	168	"	17·2
Unascertained	25	3	"	12·0
Total	243	213	"	17·1

Amongst 1,350 death of infants under two investigated during 1902–1906, the number of mothers working within a month of confinement, either before or after was fifty-nine (*i.e.*, 4 per cent.) as follows:—

Within one month before and returning within one month after	10
Within one month before, but not returning within one month after	37
Within one month after, but not within one month before	9
	59
Working within one week before the birth of child	28
Working up to the day of confinement (included in the 28)	24

Occupations of the fifty-nine.

Factory and workshop (nine unmarried, one deserted, three prematurely confined)	16
Charwomen	12
Ragsorters	12
Hawkers	7
Other unregulated occupations	12
	59

Dr. Sixsmith (Barry) agreed with a great deal of the paper, and pointed out that the question was not alone one of infant mortality. The damage could not be measured entirely by mortality figures, which took no account of the impaired vitality of the infants who managed to survive and swelled the ranks of the degenerate—a class of children which had been described as "the better dead." With regard to the view that married women ought not to be permitted to work, the speaker was proceeding to give, as a ground for a modified view and an explanation of the practical difficulties in the way, a description of family life under certain conditions, and was ruled out of order.

Dr. Reid then moved "That the period of one month's abstention from factory work away from home now imposed on mothers be extended to at least three months, and that on their return to work evidence must be produced satisfactory to the local authority that proper provision has been made for the care of the child; and (2) that no employer of labour shall permit a woman advanced in pregnancy to engage in factory labour unless her ability therefor has been certified to the satisfaction of the local authority."

Dr. J. Robertson (Medical Officer of Health, Birmingham) formally seconded the motion.

Miss Maynard (Secretary of the Industrial Law Committee) pointed out that Dr. Reid in his paper had omitted to mention the significance of the fact that many women who were employed in North Staffordshire were engaged in the manufacture of earthenware china, in which lead is used. Surely the abnormalities and still births were very largely due in that district to the use of lead, and this must make a difference in Dr. Reid's statistics.

Ald. Whitham (Barnsley), in supporting the resolution, endorsed the remarks made in Dr. Reid's paper. To some extent Staffordshire appeared to be comparable with the mining district in South Yorkshire. There was an object lesson in the percentage of still-born children which might be carefully taken home by the working classes. A miner in his labour required very good food, and insisted on having it, which had an important result in keeping the wife at home to prepare it. It was well known that a miner was quite willing to bear the expense of keeping his wife at home, not only to look after his comforts, but those of herself and children. This, it appeared to him, would have an important effect on the mortality statistics of a district. The miner generally had some hobby, and so had more opportunities for enjoying life at home than other classes of labour. Many were interested as members of that conference in hospital management, and he thought it was to the hospital nurse rather than to inspectors that health authorities should look for means of improvement. Working mothers in his district had a great objection to being dictated to, but they had a great respect for the medical profession and the uniform of a nurse. In fact, the uniform of a nurse carried with it a dignity of its own, and the working mothers would not object to a nurse in the same way as they would object to a girl of the Girton type, though to this class personally he had no objection. But a motherly visitor would do a great deal more good than an official inspector.

Miss Forrester, as a health visitor in the East End of London, urged that there should also be some protection for the women who had to work in their own homes at machines and in other ways. It was not alone the factory workers who required attention. Particularly those mothers who took in washing required help, for they were often tempted to begin work too soon after confinement.

Mr. Theodore Dodd (Oxford) desired on behalf of a lady delegate who had had great experience in these matters to put a practical difficulty before the conference. Married women who are mothers were in some respect in greater difficulties than the unmarried woman who is a mother, for the latter can go into the workhouse. The married woman often had to leave off work some time before confinement and for a period after confinement. How was she to be kept if her husband was out of work? Would the guardians give her relief? If they really wanted to meet this question of infant mortality they must try and make England do its duty. They were quite right to speak of the father and make him do his duty, but there was a duty cast on boards of guardians to carry out what was in fact the existing law. Where there was need for relief it should be given, and they must enable a married woman to exercise her rights. Under the English law a married woman who needed relief had really just as much right to it as a single woman or a single man, but some relieving officers were under the impression that a married woman, not being the head of the family, was not the proper person to apply. Of course, there were various customs among the boards of guardians in the several unions, but he thought they would be doing good work if they would make it less difficult for the married woman who needs relief to apply for relief, not only in the way of food, but also in the way of medical attendance. That would meet another of the difficulties, viz., that of getting information soon after or before the birth. It seemed to him it would be a good thing if a woman could have medical advice a month or two before the birth of her child, for this would save many a life. But anyhow it should be made clear that a married woman was by law entitled to medical relief and medical attendance if she could not afford to pay for it. If she had a husband who could afford to pay, then by all means make him pay, but if he could not, or even would not, the woman should still have her rights.

Dr. J. Robertson (Medical Officer of Health, Birmingham) said that during the last few years he had had a good deal of experience in inquiring into the condition of infants whose mothers went out to work, either in factories, workshops, or elsewhere. The health visitors had provided him with particulars of several thousands of babies, and no one could visit those infants without feeling that something ought to be done on the lines of Dr. Reid's resolution, so as to ensure that the mothers should only go to work when proper provision is made for the care of their offspring. He believed that such an enactment as that indicated would not harm the mothers. They would still be able to work, although he did not as a principle think that married women with families should work. It was impracticable at the present moment to stop it. But action on the lines of the resolution would enable some proper provision to be made, and that provision would have to be examined before the mother was allowed to go to work. He therefore seconded the resolution, and was sure that if carried out the regulation would lead to an abatement of infant mortality in certain classes of the community.

Alderman Gee (Huddersfield) explained that for a long time he had given careful consideration to this particular subject. Miss Sharples had referred to one exception in the West Riding, and that exception he believed was the town he represented. He was glad of this, because when that lady came to Huddersfield he gave her some statistics which he believed had altered her views on the subject. Miss Sharples shook her head, and he was sorry his belief in that respect was not correct. It was the fact that in Huddersfield many women went to work not from necessity but from choice, and in many instances through other circumstances, perhaps because the man was reluctant to do his share to provide for the feeding and clothing of his wife and family. The resolution was a modest one, and it did not go far enough, or at any rate not as far as a sub-committee of the Huddersfield Corporation was prepared to go. He did not know whether the Health Committee would be prepared to go as far as the sub-committee, but the sub-committee was prepared to recommend that married women should be prohibited from going to work within six months of their confinement. The sub-committee would also prohibit a married woman from working a month or six weeks before childbirth. Huddersfield was a little ahead in these matters, and he thought they were on right lines. It was said that poverty was a cause of married women going to work, and that was said when the Act was passed prohibiting married women going to work a month after childbirth. It was then said to be impossible, but nobody said anything about it now. The regulation was taken as a matter of course. He was firmly convinced that if they were to save the children they must take steps to prohibit married women from working five or six weeks before and for a considerable time after confinement. It had been said that there were difficulties in the way of a mother staying at home beforehand, but he thought that could be got over by the method adopted in some foreign countries of a mother insuring for a sum of money. If that could be done abroad why could it not be done in this country? He agreed very largely with Dr. Reid's paper, which put the matter very carefully without going to extremes. He therefore hoped the conference would adopt the resolution.

Dr. J. M. Rhodes said that he would not have spoken on the subject but for the remarks of Mr. Theodore Dodd in regard to poor law relief, which appealed to him strongly as a member of the Council of the Poor Law Unions Association for England and Wales. Knowing as much of poor law administration as any man, he emphatically stated that there was not a single board of guardians which would refuse relief to a woman on confinement. Guardians looked upon this class of case with the greatest humanity; much help was given to those cases, and the boards of guardians deserved credit for their policy in this respect. With regard to the subject under discussion, there was great difficulty in keeping the women from going back to the mills after confinement. They insisted upon going back even when they had husbands. There was a great deal of mortality among children caused in this way, for the infants were left to be fed on cornflour and water and other abominations. He regretted to say that one district for which he was responsible partly was Salford, which had an infant mortality of 195 per 1,000, and there was Barnsley, the worst place in England, which employed more women than any other town, and that had the highest mortality in infants. They must make the public understand that the employment of women directly after labour was simple murder, and he hoped the conference would express a strong opinion that women should not go to work until at least three months after their confinement.

The Mayor of Huddersfield stated his absolute concurrence in the resolution, which he regarded as a minimum. They would remember what Mr. John Burns told them the previous day—words he would never forget—that he favoured married women not working three months before and six months after confinement. That was the ideal at which they ought to aim. They required to educate public opinion on the matter, and he was proud to think that public opinion in his own town was on the right side. He believed that Mr. Alderman Gee had been one of the educative influences there which had brought about that public opinion, so that now in Huddersfield a man felt disgraced if his wife had to go out to work to maintain herself and her family, thus doing double duty. He regarded that as a healthy public opinion. It was an extraordinary development of civilisation that we should do with our women what no farmer would think of doing with his cattle, make them do not only double but often treble duty—bear children, go out to work, and attend to the household. This was an abomination which ought to be put an end to at once by the mere force of strong and manly opinion in this country. Every Englishman should regard it as a duty to make it impossible for women to work in factories after childbirth.

The motion was then carried *nem. con.*, and the conference adjourned.

SECOND DAY—AFTERNOON SESSION.

Alderman Evan Spicer, M.P., again took the chair.

THE REGULATION OF THE PLACING OF INFANTS OUT TO NURSE.

By SAMSON GEORGE HAYDOCK MOORE, M.D., D.P.H.,

Medical Officer of Health for Huddersfield.

It is not only pleasant, but frequently useful, to give rein to one's imagination, and to speculate on affairs in one direction or another.

Let us imagine that a total stranger were to come among us, and live in our midst long enough to get an insight into our lives, and habits, and customs, and beliefs, and opinions. What impression would most likely be produced in his mind? It is necessary to suppose such a being to be endowed with a high order of intelligence, and to be without preconceptions; that he came in fact from another planet; that he was an onlooker quite without bias. Is it not the case that as the result of a study of the expressed thought and belief of the English-speaking peoples, as he would be likely to learn them from current literature (whether the newspaper press or published volumes), he would discern as the predominant note the belief that to-day we have advanced, that we have progressed, that we have availed ourselves of the accumulated wisdom of the ages that are gone? The belief would appear that in the matter of scientific discovery much further progress is likely to be made, but on the social side of our life I do not think it will be doubted that our belief that we have done well, that our peoples are better off than they have been, and that a very high degree of advancement has been reached would be apparent.

It is not my purpose now to deal with more than a very small part of the question that may be asked with propriety here, namely, Would such observer be inclined to adopt the prevailing tone? Would he acquiesce, or would he be able as the result of his intelligence and detached independent outlook to point out to us inherent essential failures in our system?

I think you will agree that if it were pointed out to him that where for one cause or another the very young of the human race must be deprived of their own mother's care for long intervals during the day, and day after day, for considerable periods of time, no supervision is deemed necessary by the State for seeing that the persons into whose charge they are delivered, and the places where these people receive them are suitable for the purpose, he would be inclined to dissent seriously from any statement to the effect that our social organisation was satisfactory. He would most likely say that this omission was of so grave and substantial a kind as to constitute a serious blot on the whole scheme. Yet such is the case. A woman may receive any number of infants or children early in the morning, and become responsible for their welfare until night, absolutely without complying with any State regulations, or being subject to any State supervision.

Of course the mother is the natural person to look after her offspring. It may be urged that she may be relied upon to leave her own children only under proper conditions. But the very circumstances of the case contradict this optimistic and comfortable assumption; because, on the one hand, if she is under the compulsion of letting her children be absent from her, she may also be under the compulsion of leaving them in places of which she does not approve; while, on the other hand, if she is not under such compulsion, and still forsakes her children for the day, then she herself obviously is likely to need oversight.

Different conditions prevail in this connection in different localities. This particular question probably does not arise in many places, but in others, and particularly in the big manufacturing towns, where the principal industries are such that large numbers of women are employed away from their homes, it is one of considerable importance. A very large number of mothers commence work in the mills at 6 or 6.30 in the morning. They remain there, it may be, until 5.30 in the evening, or later, or they may go home for a midday meal. Before going to work they hand their infants over to a neighbour, or it may be to a neighbour's child, the neighbour herself also working in the mill. The apartment where two or three of these forsaken infants are received may be clean, or it may not. It may be sanitary, or it may not. It may be above ground, or it may be underground, a cellar. It may be crowded, or it may be overcrowded. The person who is in charge of these children may be sober or may be drunk, an adult or another child, may be kind or may be cruel, may know something about children or may be entirely ignorant.

In these towns—the very places where the nation's wealth is largely produced—infants die at the rate of 200 to 250 per 1,000 births; and this great, enlightened, advanced, progressive nation goes on its way unconcerned, unheeding, contented apparently that they should do so. There is very little notice taken of these helpless pitiable sacrifices. In India we have prohibited "suttee," but the widows who immolated themselves there were at least able to perpetrate the sacrifice themselves, and did so voluntarily. We do not prohibit, we do not take any means to prevent, *this* sacrifice, where the victims are not voluntary.

I submit that the time has come when this omission in our social organisation should be made good, and I therefore submit the following resolution:—

"That, having regard to the ascertained fact that in centres of industry where women are largely employed away from their homes an excessive number of deaths of infants takes place, and that this in the opinion of observers, who by their experience are best qualified to form a sound and trustworthy opinion, is contributed to by the improper and insanitary conditions under which infants are placed out to nurse day by day, it is necessary that steps be taken to supervise the persons and the places where infants are received for day nursing."

THE AMENDMENT OF THE INFANT LIFE PROTECTION ACT.

By ALFRED GREENWOOD, M.D., D.P.H.,

Medical Officer of Health for Blackburn.

As is well known, the Infant Life Protection Act of 1897 is an Act to amend the law for the better protection of infant life, and it repealed the Infant Life Protection Act of 1872.

The 1897 Act makes it compulsory on every person retaining or receiving for hire or reward in that behalf more than one infant under the age of five years for the purpose of nursing or maintaining such infants apart from their parents for a longer period than forty-eight hours to give notice thereof to the local authority within the forty-eight hours.

Other provisions relate to notification of removal of infants, inspection of infants and premises, character of person in charge of such infants, notification of death to the coroner, etc.

The Act does not apply to the relative of any infant, poor-law work, hospitals, convalescent homes, or institutions established for the protection and care of infants, and conducted in good faith for religious or charitable purposes.

Although this Act has resulted in much good, as exemplified in the valuable work of Miss Frances Zanetti, of the Chorlton Union, Manchester, and others, there is need for several amendments.

Several attempts have been made to bring about these amendments, and the press have maintained that a case has been proved for the necessity of such alterations, notably *The Lancet*, *The British Medical Journal*, *The Hospital*, and *The Child's Guardian.*

The majority of people will agree that all children put out to nurse, whether illegitimate or legitimate, should be properly cared for as regards sanitary condition of the home and suitability of the character of the woman taking charge.

Owing to certain defects in the Act, this is not possible.

A very unfortunate defect occurs in the Infant Life Protection Act in the omission of any provision for regulating the placing out to nurse of single children. It is very necessary that this defect should be remedied, particularly in view of the facts that very large numbers of the "boarded-out" children are illegitimate and delicate, that the death-rate is higher amongst illegitimate children than others, and that the number of inquests held upon them is also great. The parents of many of these infants are only too glad to place them out to nurse, and the woman who takes charge and receives a lump sum of money frequently neglects the child, and when death ensues she is anxious for another infant on similar or better terms. This may go on indefinitely, and, simply because she has not two or more children at the same time, she escapes supervision under this Act. Some of these cases have only been brought to light in indirect ways, such as through the action of the National Society for the Prevention of Cruelty to Children, or by medical men refusing to sign death certificates.

The framers of this Act appear to argue that, although there may be danger in cases where two children are placed out to nurse, there is no danger where only one child is sent. It is obvious that this is a most illogical position.

In her last report, Miss Zanetti says: "Eight years' experience has strengthened my conviction that it is only right and reasonable that every child maintained *for hire or reward* apart from its parents should be entitled to the protection afforded by the visits of an inspector."

Another defect in this Act occurs in section 5, which states that any person retaining or receiving an infant under the age of two years on consideration of a sum of money not exceeding £20 paid down, and without any agreement for further payment, as value for the care and bringing up of the said infant until it is reclaimed or of an age to provide for itself, shall within forty-eight hours from the time of receiving such infant give notice of the fact to the local authority. The penalty for non-compliance with this section is forfeiture of the sum received, or of a less sum, and removal of the infant to a place of safety.

If a woman could prove that she received one penny more than £20, she would be exempt from this section. There is no doubt that sums slightly over £20 have been paid with the object of avoiding registration. Or if she could not prove this and had spent the £20 it could not be forfeited.

It appears that, in default of paying the sum which the Bench has decided should be forfeited, there should be power to imprison such a defendant.

In the report of the London County Council on the operations of the Infant Life Protection Act during 1905 it is said, "Four cases have arisen which again demonstrate that it is the 'lump-sum' infant which is most likely to meet with improper treatment, or to be taken with no intention of complying with the Act."

Attempts have been made to amend the Act in the application of its provisions to the placing out to nurse of single children, but they were opposed. The opponents of this amendment suggested that it would hamper the excellent rescue work being carried on among poor girls, "with the result of an increase in desertion, infanticide, and even suicide, thus producing more harm than good." I question whether there is justification for this extravagant statement. Possibly a certain number of superior fostermothers object to inspection. But the objection could only be a sentimental one, and quite secondary to the benefit which the children would receive. It seems strange that they should object to inspection if everything was satisfactory. At the same time care should be taken that there is no clashing with rescue societies or over-inspection, and it has been suggested that it might be feasible to recognise members of rescue societies as official inspectors in the cases in which they find the homes and visit the children.

The amendments in the Infant Life Protection Act which seem to be necessary, and at the same time just, are as follows:—

1. That the provisions of the above Act should apply to single children placed out to nurse.

2. That the provisions should also apply to cases where a lump sum of more than £20 is paid.

3. That power for imprisonment should be given if the sum forfeited cannot be paid.

It has also been suggested that the age limit of protection should be extended to under seven years. But I believe it would be unwise to press for this amendment, because after the age of five years children are under a certain amount of supervision by teachers at school.

The fact that there is any loophole of escape from the provisions of the Act on the part of persons to whom they should obviously apply should warrant the adoption of the above amendments.

The Act would thus be rendered infinitely more useful in that many more of these young lives, now thrown away recklessly, would be safeguarded.

Dr. Moore moved, "That, having regard to the ascertained fact that in centres of industries where women are largely employed away from their homes, an excessive number of deaths of infants takes place, and that this is contributed to by the improper conditions existing at the houses in which the infants are placed out to nurse, it is necessary that the persons by whom and the places into which infants are received should be under supervision by the local sanitary authority."

Dr. Greenwood seconded the motion.

Miss Brodie Hall (Eastbourne Board of Guardians) said that Dr. Greenwood had described in perhaps less vigorous terms than were warranted, in her opinion, the great insufficiency of the Act as it now stands for achieving the purpose for which it was supposed to have been passed. As representing the Eastbourne Board of Guardians, she asked for their earnest support and interest in urging the Government, without any further delay, to amend the present Act and its futile provisions. Directly that Act came into force her board appointed a lady inspector—she was afraid that in this respect this board was only one of about two dozen throughout the whole country—so that they had had practical experience of the failure of the working of the Act. But without any practical experience, anyone reading through that Act on paper, if they had any power of perception at all, would see that two or three of its clauses were literally little less than an incentive to crime rather than a prevention of it. Dr. Greenwood had pointed out two foolish provisions in that Act, and she would ask what they thought the effect on an uneducated woman would be—she would not stop to consider what philosophic reasoning might be read into the clause by a very educated mind—when she found on taking her child to nurse that the Act most strangely protects two children, but lets the nurse off if she is only clever enough to do things slowly, and takes no more than one child at a time—that a woman can do one child to death, and go on for thirty or forty years if she can escape the attention of the police. What was the worth of a bill which laid it down that two children are worth taking care of and one is not? Then as regards the £20 down for adoption, if she takes only £20 1*s*. then the State does not care any more about that child; the foster mother could do anything she liked with it. Another perfect absurdity and great defect in the Act, which Dr. Greenwood had not mentioned, was that as the statute read at present a local authority had no power to remove a child from an undesirable home unless it could be proved that its health was in danger. It was not necessary to point out to an audience like that that what was wanted was power to deal with conditions of bringing up which would make a child a wreck and burden to the State instead of a boon to the nation. That was a very important item in regard to which the Act required amending. As regards the number of children who do not come under the Act—who she was quite sure they would agree ought to come under the Act—the figures would astonish them. Only to quote one illustration. In her union only one-fourth of the cases put out to nurse could be legally inspected. Happily, as was the case with Miss Zanetti, many who took single children were quite willing to be inspected, but directly a bad woman was found, she could shut the door in the inspector's face, and the inspector had no legal right to force an entrance. Miss Zanetti had supplied these figures in a poor law conference paper. Of 761 children in the Chorlton, Manchester, and Prestwich district, only 139 were nurse children which came under the Act. It was absurd to suppose that five-sixths of those children did not need as much supervision as the one-sixth. She further mentioned that out of 115 cases which came properly within the Act, only four were found to be actually bad cases, whereas out of 570 single child cases, where her inspection was only allowed on sufferance by the mothers and could have been refused, only one-fifth of those cases were in any sense satisfactory. It would show the great need for an amendment of the Act when it was considered that four-fifths of the children put out to nurse were outside the provisions of this "protecting" Act. Could such an Act as that be described as protecting? Indeed, she could hardly help thinking that an Act which was so insufficient, and had a title which reassured the public as this Act did, was far worse than if there was no Act at all. If there were no Act, the police, the National Society for the Prevention of Cruelty to Children, the boards of guardians and others would keep a very much more watchful eye on such cases. But they were deluded by the title of the Act and its supposed object, which was to protect every nurse child put out to nurse, apart from its parents, but which it entirely failed to do. Reference had been made to the causes of obstruction to the amendment of the Act, to the amending Bill which had been introduced into the House of Commons for five sessions and was shortly to be introduced again by the Poor Law Unions Association, to get the three points she had referred to amended. No doubt all opposition, in the promotion of the Act as it now stands, and in each session since to the amending Bill, originally came from the London Diocesan Rescue Society, supported to some extent by the Charity Organisation Society. She wished to say nothing against the Rescue Society—it was doing magnificent work—but she did suggest it was absolute selfishness that any few philanthropic societies engaged in rescue work should oppose because of their own interests, although she did not know that it would do them any real harm to have the Act amended. Was it right that they should selfishly indulge in what was an assistance to their own work, comparatively a small work in the area of the metropolis, and deny that protection which was needed to all the wretched infants who were placed out in all the other parts of England and Wales? But there was one other thing to be said. She had taken a great deal of trouble in seeing members of the late Government and members of Parliament privately, and they all assured her that unless a request went from a united body such as had assembled that day, from boards of guardians and those who work the Act, the Government would not feel able to take steps to remedy the evil. They had had much encouragement during the last few months from the present Home Secretary, who had promised when this Bill was introduced into the House he would help them to get it referred to a Select Committee. She therefore asked the conference to strengthen their case by sending up the resolution to the Government. If any delegate would send her a postcard to Eastbourne, she would gladly send them a copy of a paper on the whole history of the question read at the Central Poor Law Conference two years back. In concluding, Miss Brodie Hall said that she could have given many instances of cruelty to children, but as Miss Frances Zanetti was present, that lady would be able to deal in a more thorough manner with that branch of the subject and its practical working.

Dr. Moore asked leave to add to his motion the following words: "That the Infant Life Protection Act be amended to remedy abuses which are not at present provided against." He observed that he had read the pamphlet referred to by Miss Brodie Hall, and commended it seriously to the attention of the conference.

Miss F. Zanetti (Inspector under the Infant Life Protection Act for Chorlton, Manchester and Prestwich district) stated that the Act came into force in January, 1898, and the unions in the district she represented were the first in the country to appoint an inspector to look into these cases. At the end of the first year's work, when she submitted her report, and the joint committee embodied it in their report, the Poor Law Unions Association at once drafted an amending Bill, which was introduced by Mr. Spear, M.P., into the House of Commons in 1900. Unfortunately it did not reach second reading. Miss Brodie Hall had told the conference that the opposition came chiefly from the London Diocesan Council for Rescue and Preventive Work, and she proposed to give those objections, and to answer them from her own experience. As regards the lump sum cases, there was no opposition. All were unanimous that it is most absurd to suppose that a child taken for £20 must be included, and that one taken for £20 and 6*d*. should be excluded and did not need inspection. She had a great many cases in which the extra 6*d*. was paid. It was supposed to go towards a mail-cart. There was a curious point about lump sum cases as they now stand; if a woman failed to notify a lump sum case, it was not classed as an offence and no penalty could be imposed. The magistrate simply ordered the forfeiture of the whole or part of the sum paid. They could imagine how little of that sum would be left at the end of a year, or if the offence was not found out at once. She would not dwell on the many terrible things she had discovered during her work among these cases, and would only mention that in one case a mother sold her baby for 6*d*. Dealing with the one child cases, she said that the majority of these cases were one child cases, and any law supposed to protect infants placed out to nurse which failed to include within its scope five-sixths, as she found was the case, must be considered, to say the least, inadequate. The Rescue Society said that if the one child cases were inspected there would at once be a scarcity of thoroughly good women nurses, because the thoroughly good ones would object to being inspected. They said that it would lead to infanticide, desertion, and even suicide, and also urged that the profit was so small in these cases that there was no inducement to women to neglect a child, and that the children were often taken from affection and sheer love of child-life, and hence ought not to be inspected. Her experience was diametrically opposed to every one of these suggestions. Last year she made a point of getting at the feelings of all these women who take these children. They sometimes said they wished her to come again. She would tell them they could turn her out, as she had no right there unless wanted. Those women invariably replied that they had never heard of such an absurd thing, and asked, "Does it follow because a woman has two children that she is not all she ought to be, and because she has one child she is all that she ought to be?" The thoroughly good ones preferred to be inspected—it was a defence against the malicious attacks of neighbours, who called them baby farmers. If the home was inspected it was all right, and they did not mind what other people said. She was somewhat too sceptical to think that women had a tremendous love for a strange child, while even grandparents, uncles and aunts took children and money and never received inspection. Nearly all these children were illegitimate, and the sympathy was with the mother and not with the child, and these were the people who would say "Poor little thing, it would be a mercy if the Lord would take it." She could not help thinking that the sympathy of the Rescue Societies was with the mothers rather than with the children, and that was the great mistake. The mothers had frequently written to her asking her to look after their babies, and she had never found a mother inclined to desertion or infanticide because she knew that someone was taking an interest in her baby. As to the profit being so small as to be no inducement, that was an argument which cut both ways. The one child was taken in because of the little money it would bring, and that money was not spent on milk, but they were fed on the domestic diet of the family, or currant buns, and out of dirty long-necked bottles, and as many of these women did machining or other work all day, the baby would be put into a bassinette and allowed to lie there from morning to night. No wonder so many of the babies died. This society also argued that at least these children were as well treated as the children of the people who take them. But was it not absurd to argue that because a certain number of people mistreat their own children, they should be also given little illegitimate children to do as they liked with? Besides, illegitimate children were not normal children. Their mothers had often suffered greatly, and perhaps often had done their best to prevent the child being born at all; they were often born delicate and often before they were due, and they could hardly be expected without extreme care to get through the first crisis of life in teething. When the Act was passed, the Lord Bishop of Winchester said that it was to be distinctly understood that this Act was not aimed at baby-farmers, but against hundreds of careless women who through sheer ignorance were sacrificing infant lives daily. Had that wicked ignorance decreased since the passing of the Act? She had not found so, or that children were better treated; and unless they could point to the fact that that ignorance was being dispelled, they must continue to send women visitors to teach the people, and encourage them to treat the children in a more sensible and humane manner. For some time she had thought, with Miss Brodie Hall, that it was a shame these rescue societies should deny to other children the benefits that were accorded to their own. When the babies were placed out by the rescue societies, the women were carefully chosen, they attended mothers' meetings and brought the babies with them. There were visitors—not called inspectors—who visited the homes regularly, if only to pay the money. Those children were seen about six times a month, and there was a constant inspection to see that the women did their duty. Now, it was cruel on the part of these small limited societies to deny that same protection to other unfortunate illegitimate children, a protection so splendidly extended to their own children. Coroners, all inspectors, most boards of guardians, were all in favour of the amendment of the Act. The question was brought up at the Central Poor-Law Conference of 1902, and at the North-Western Conference of 1903, and at the South-Eastern Conference last year. On every occasion the amendment was carried through triumphantly, and once a barrister was briefed for the other side. She was the selected speaker then, and, with Miss Brodie Hall, they carried everyone with them. In concluding, Miss Zanetti said that under the present system the worst cases escaped inspection. She had known women with more than one child deliberately give up a child in order to avoid inspection. Last year they struck a woman off the rolls, and that woman at once took one child and told the authorities they could not inspect her. The respectable people welcomed inspection, but the baby-farmers hated it, and they could pretty well understand the reason of it. It was most important they should be united on this subject before Parliament, and if they could get over the difficulty by recognising the inspectors of the voluntary societies as inspectors of their own cases, they ought to do it. Let those societies have a guarantee to do their own work, but allow other people to do theirs. Let the metropolitan societies hold aloof, in some matters the metropolis was treated specially, and it might be exempted by a special clause; but the rest of the country should be protected, so that these poor little illegitimate children should not go to swell the death-rate. If this were done they would be striking at one of the chief sources of the evil of infant mortality.

Dr. J. M. Rhodes said that he was voicing the opinion of every one present when he said that they were all much indebted to Dr. Moore and Dr. Greenwood for their excellent papers. He did not think two more valuable papers could have been read. After a long experience he was convinced that the present Act was not worth a tinker's nothinger. He had been chairman of the Infant Life Committee in Chorlton, Manchester, and Prestwich when they got Miss Zanetti's first report, and they came to the conclusion that the Act must be amended. He had not changed his opinion since that time. The amending Bill was to come up before the House of Commons again, and he hoped that the conference would speak out and support their Bill. The poor-law guardians of England and Wales said the £20 limit must be swept away. They also said that every child must come under inspection if it is taken for gain. The opposition to their Bill had been referred to, and it had been said the inspection of one-child cases was absurd. His answer to that was that it was done already. He had been contradicted at the International Congress, and he was able to show that it was done in the State of Massachusetts, and lately Spain had adopted a similar measure. Last month he had had the honour of being a British representative at the International Congress held at Milan; there were 1,300 delegates, and he was glad to say that congress passed unanimously a resolution in favour of the inspection of one-child cases. This was a question of baby-farming. It might be conducted on wholesale or retail lines. One form of the wholesale they came across long ago, but another form came to light recently. The system was to advertise in certain papers for children to adopt, and in other papers to advertise for persons willing to take the children, and they make a profit on the transaction. In one case £60 was paid with the baby, but they only paid £6 for the child to be taken by a nurse mother. Another child was taken with a premium of £250. This was proof of the necessity for making every child taken for gain come under inspection. He gave an instance coming within his own experience of a woman with a child who died in a particular way. She had another child going off in the same manner. He was called in and found that the child was being fed on cornflour and water, and his opinion was that that woman had been so treating it in order to get rid of it because it was well insured. He threatened that if he ever had another case with her he would report, but needless to say he was never called in there again. Something had been said about children being fed from long-necked bottles with tubes, and in this matter they might well follow the example of their friends in France, where the long tube feeding-bottle was altogether prohibited. In concluding, he suggested that a copy of the resolution should be sent to the Poor-Law Unions Association, the British Medical Association, and the Central Poor-Law Committee, together with the Home Secretary. An enormous amount of good would be done by the papers and discussion, and he hoped that at the International Congress to be held next year at Berlin that conference would be represented.

Dr. Haworth opined that this matter touched the root of the infant mortality problem. He represented a manufacturing town in Lancashire, where the custom was to take the babies at half-past five in the morning, in all weathers, to places to be nursed throughout the day, not from necessity, but from choice on the part of the majority of the women, who preferred to go to the mills because it was monotonous at home. They did not need the money, because the husbands could earn sufficient to keep themselves and their families, but so much was now spent on dress and amusements that the money was wanted in that way. The children were taken along the streets in the coldest weather wrapped in an old shawl, and put into cradles with some dirty straw in it, and "taken care of" by a woman who was generally past mill work herself. For every child a sum of 5*s*. a week was paid, which was to cover the cost of nursing and proper food. Needless to say, they got very little milk. Mostly the children were fed, as had been stated, on bits from the table, before they were nine or twelve months old. Mostly they had condensed milk, and much less farmers' milk was sold than should be the case. These people should certainly be inspected, and the people taught how to take care of the babies properly. He felt very strongly on this matter, and heartily supported the resolution, believing that all children taken for gain should be under strict supervision.

The resolution was then unanimously carried, with the additions suggested by Drs. Moore and Rhodes.

THE CHEMISTRY OF INFANT FOODS.

By JAMES KNIGHT, M.A., D.Sc., F.C.S., F.G.S., F.E.I.S.,

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"Marriage is honourable in all."—*Heb.* xiii. 4.

"Matrimony was ordained first for the procreation of children."—*Book of Common Prayer.*

"Children are an heritage of the Lord."—*Psalm* cxxvii. 3.

"If any man provide not for his own, and specially for those of his own house, he hath denied the faith, and is worse than an infidel."—1 *Tim.* v. 8.

"The mothers of to-day do not know the A B C of their own business."—*Strauss.*

"The mother who cannot nurse her child is physically degenerate; the mother who can, but will not, is morally degenerate."

"Take this child and nurse it for me, and I will give thee thy wages."—*Exod.* ii. 9.

Everyone who examines vital statistics cannot fail to be struck with the enormous waste of human life which prevails during the first five years, and more especially during the first year, of infancy, and his surprise is deepened when the fact emerges that an unusually large proportion of the deaths in that period is due to preventable causes, arising out of culpable carelessness in respect of three matters, food, clothing, and fresh air. Most of the neglect in the first of these respects is due to ignorance coupled with not a little laziness, and the same lack of energy which serves for breakfast boiled ham and "essence of coffee" shows itself in infant mismanagement, first in neglect of natural nursing, then in recourse to those artificial infant foods with which the British market is crowded.

More attention has been paid to this great and growing evil in France, where, owing to her stationary population on the one hand and the demands of her military and political system on the other, every life is of value, and the only means of increasing or even maintaining the population seems to be that of lowering the death-rate. It is in France, accordingly, that we find the most advanced methods of combating this waste of infant life, and nowhere have remedial measures been carried out so systematically and successfully as in Paris, especially in the working-class districts of Belleville, Montmartre, and Vaugirard.

According to M. Bertillon, 46,285 children were born in Paris in 1881, of whom no fewer than 10,180 died within the year, and of these again 5,202, say half, died of athrepsia. These figures state the problem; the following suggest a remedy:—In 1882 Dr. Giberton-Dubreuil, who manages the crêche at Versailles, reported that he had twenty-four infants under his care, some weaned, some on the breast, some on the bottle exclusively, some on mixed diet, fed in various ways, but always under supervision. The result was that during sixteen months not a single death occurred, while the death-rate in the town of Versailles for infants of corresponding years and status was 12 per cent. Recent experiences in Huddersfield are fresh in your memory. Two things have arisen from this: instructions to all parents, in the form of a printed circular handed to the parent on registering the birth of his child; secondly, systematic instruction in the principles of infant feeding as part of the examination syllabus for midwives and to a less extent for medical men. Over and above, there is in France *the Roussel law*, which prohibits the administration of solid food to a child under twelve months without the express direction of a medical man, but though this law has banished from France those infant foods which are so common here, it cannot prevent those domestic breaches of hygiene exemplified in the addition to infant dietaries of toast water, pap, flour, and other starch preparations. These additions are dictated by the kindliest of motives, and arise from pure ignorance; a fact which calls for an educational campaign among mothers and daughters. The precise form of this educational campaign forms another branch of inquiry; meanwhile I propose to examine the various preparations which profess to be a substitute for mothers' milk, and I have confined myself to those articles on common sale.

In the following analysis, the nitrogen in the dry foods was estimated by Kjeldahl's method, and the fat extracted with petroleum ether in Soxhlet's apparatus, while in the prepared foods the excellent method of Ritthausen was employed for proteids, the fats being extracted as before. In one or two cases, more especially those claiming to be milk substitutes, supplementary estimations of fat were made by the Leffmann-Beam apparatus. Carbo-hydrates were exhausted with water at nearly 40°C., and classed as soluble and insoluble at that figure. In addition to the purely chemical analyses, a microscopic examination was made, with confirmatory results so far as starch and cellulose were concerned, while one or two digestive experiments were made *in vitro* with the milk substitutes.

The solid foods fall into two classes, milk adjuvants and milk substitutes. To the former belong three groups: biscuit foods like Ridge's and Neave's; malted foods like Benger's, Savory and Moore's, Allenburys' No. 3, and the Frame Food; lastly, Mellin's, which stands alone. The second class includes Allenbury's Nos. 1 and 2, Nestlé's Milk Food, and Horlick's Malted Milk, all of which are intended for use without milk.

Ridge's Food.—Ridge's Food is a yellowish floury powder, easily forming into lumps on exposure, and having a characteristic floury taste and odour. It is very simply made, the whole process consisting of gently heating wheaten flour till it takes on a yellow tint; then it is further heated to expel water and arrest any malting. The samples are far from uniform, especially in the proportion of water they contain, and hence different analyses give apparently wide results, but when calculated to a water-free basis these differences are slight. The directions for use are vague. A large tablespoonful of the dry food is to be mixed to a cream with either cold water or milk; then half a pint of milk or water is added, and the mixture is heated with constant stirring till it boils. As will be seen, the prepared food may vary very considerably according as it is made with water alone or with milk alone. In the former case a very thin gruel is obtained, almost destitute of fat (only 0·8 per cent.); in the latter a paste results impossible to serve through a feeding bottle, as suggested. The process is troublesome, and the food burns readily, giving charred products and imparting a bitter taste, and indeed in all these starchy foods the attention bestowed on their preparation would give vastly superior results if bestowed upon ordinary cows' milk, to say nothing of the saving of expense, for all these foods are comparatively dear. Iodine reveals the presence of a great deal of free starch, a result confirmed by the microscope, and also by chemical analysis. My analysis of the dry food works out as follows:—

Nitrogenous	9·26	per cent.
Fat	0·80	,,
Carbo-hydrates . . .	82·85	,,
Ash	1·28	,,
Water	5·81	,,
	100·00	

Most of the carbo-hydrates are unaltered starch, a very little being dextrine and maltose; on extraction with water at 40° C. only 2 per cent. were found to be soluble.

On making up this food with water alone the result was as follows:—

Nitrogenous	0·81	per cent.
Fat	0·07	,,
Carbo-hydrates . . .	7·96	,,

When made with milk alone the analysis showed—

Nitrogenous	4·1	per cent.
Fat	3·70	,,
Carbo-hydrates	12·58	,,

The milk used in this and subsequent analyses had a specific gravity 1,032, and the following composition:—

Proteids	3·6	per cent.
Fat	4·00	,,
Lactose	5·37	,,
Ash	0·4	,,
Total solids	13·37	

From the analyses above it is difficult to see in what respects Ridge's Food can claim a place in infant feeding. It is condemned by the very large amount of unaltered starch present, by its great deficiency in fat, by the premium it puts upon carelessness in its preparation, and especially in the proportions to be employed. Further, it has to be used with milk, if it is to be of any service, and cannot be said to improve the milk in the direction of "humanising" it or of making it more tolerable to an infant.

Neave's Food closely resembles Ridge's, but the basis of it is oat flour instead of wheat. It also contains a good deal of free starch, but the proportion of fat is slightly higher. It is a light brown powder, and is made as follows:—Mix two tablespoonfuls of the food with cold water to a thin paste, add a pint of boiling water, and boil gently for five to seven minutes, taking care not to burn the food. To *some* of this add milk and water, half and half; then sweeten to taste. Increase the proportion of milk for diarrhœa, and of food for constipation.

On making up, the characteristic odour of oatmeal is very perceptible, and the microscope reveals the presence of oat starch. Chemical analysis gives for the dry food—

Nitrogenous	12·10	per cent.
Fat	0·86	,,
Carbo-hydrates	82·03	,,
Ash	1·01	,,
Water	4·00	,,

and for the food made up with water only—

Nitrogenous	0·78	per cent.
Fat	0·005	,,
Carbo-hydrates	5·40	,,

The proportions of milk and water are stated in such vague terms that the employment of this food resolves itself into a rule of thumb, with the infant for reagent. A very objectionable feature of this and most foods is that they are made up in large quantities for twenty-four hours' use, and no indications are given as to the prevention of germ infection on the one hand or the maintenance of scrupulous cleanliness on the other. The quality of the milk to be used is also left out of account.

Savory and Moore's Food is a white powder resembling flour, and having a taste like that of a half-baked biscuit. It contains free starch, as shown by iodine and the microscope. I have not once seen a sample in which all the starch was malted. On making up it presents an unpleasant odour, due to malt or other ferments, and the directions are very vague indeed. The food, quantity not stated, is made into a thin paste with a half-and-half mixture of milk and water; then one-third pint of boiling milk, and water is gradually added, with constant stirring. The mixture first thickens, then thins again, and when cool is ready for use. The proportions of milk and water vary from 1:2 up to 1:1, and the quantity begins with a small teaspoonful, gradually rising up to a tablespoonful or two at each meal. Owing to the presence of malt in this food, the proportion of soluble carbo-hydrates is much greater than in the previous foods; extraction with water at 40° C. showed as high as 43·6 per cent. of soluble matters, chiefly dextrin and maltose. The chemical analysis of the dry food gives—

Nitrogenous	10·36 per cent.
Fat	0·86 ,,
Carbo-hydrates . . .	81·19 ,,
Ash	0·75 ,,
Water	6·84 ,,
	100·00

Benger's Food.—Benger's Food is a white powder resembling wheaten flour. Iodine and the microscope reveal the presence of free starch to a large extent, though the mixture claims to be "pancreatised." It is a cooked food, made by warming wheaten flour with fresh milk, and adding a little malting ferment. The instructions are—Mix a tablespoonful of the food with four tablespoonfuls of cold milk to a thin paste; then add slowly half a pint of boiling milk and water (1 : 2); then set aside for fifteen minutes, pour into a saucepan, and slowly heat, stirring till it boils. When cool it is ready for use. A tablespoonful of cream may be added, and a large quantity may be made at once and kept in a cool place. Benger's Food is never to be prepared with water only.

This food, it is evident, is more troublesome to make than the others, but it is certainly more easily tolerated by infants, and it contains a fairly high proportion of soluble matters, 48½ per cent. on extraction at 40° C.

My analyses are as follows:—

	Dry Food.	Prepared Food.
Nitrogenous . .	12·48 per cent.	2·1 per cent.
Fat	0·86 ,,	1·8 ,,
Carbo-hydrates . .	76·91 ,,	6·2 ,,
Ash	1·06 ,,	
Water	8·69 ,,	

Frame Food, made by a company in Battersea, is a very good example of a biscuit food, with the addition of the digestive action of malt, and the process, as carried on at the works, is rather interesting. The basis of it is wheaten flour, and to this is added a strong extract of malt made in a vacuum pan from the whole grain, so as to recover those mineral constituents of the bran which are generally lost in milling. The wheaten flour thus mixed with the hot extract gives a dark brown paste, which, after standing some time to allow the malt to act, is treated as a biscuit dough, rolled out in the usual way, cut into squares, and baked in a travelling oven. The biscuits thus produced are then ground into powder, which represents the finished article. In consequence of this treatment, the food shows a very low proportion of water and a high percentage of ash, due to an accumulation of bran phosphates, while the matters extracted at 40° C. run up to nearly two-thirds of the whole. Iodine reveals the presence of free starch, but this rapidly passes into dextrin. No traces of starch grains were found under the microscope, any starch present having been broken up and metamorphosed by the combined malting and baking already described. To make up the food mix a teaspoonful (about 6·15 grains) with cold water to a smooth paste; add boiling milk and water (1 : 2) to fill a breakfast cup; then boil slowly for six minutes or longer.

My analyses are—

	Dry Food.	Prepared Food.
Nitrogenous . .	19·86 per cent.	4·5 per cent.
Fat	Traces only.	1·1 ,,
Carbo-hydrates . .	76·54 per cent.	14·49 ,,
Ash	3·42 ,,	
Water . . .	0·18 ,,	

Mellin's Food occupies a peculiar position, inasmuch as the method of preparation employed has reduced it to an almost pure dextrin. It is a yellowish-brown powder, with a sweet honey taste and the odour of malt. It is very deliquescent and highly soluble; extraction in water at 40° C. gave 87·6 per cent. of soluble matters, the solution being slightly alkaline. There is no trace of starch either to iodine or the microscope. On standing three or four days the solution ferments, giving an odour of sour beer and turning acid.

Like the preceding foods, this is made with milk, the instructions stating that for infants up to one month old two full teaspoonfuls (8·5 grains) of food are to be added to five tablespoonfuls of milk and eleven tablespoonfuls of hot water; for three-month infants three level teaspoonfuls of food to eight tablespoonfuls of milk and the same of hot water; for six-month infants one heaped tablespoonful of food to twelve tablespoonfuls of milk and four of hot water. The liquid must not be boiled, and no sugar is to be added. Many analyses have been given of this food, some of them differing widely in respect of water. My own figures are—

	Dry Food.	Made up for three months.
Nitrogenous	10·01 per cent.	1·63 per cent.
Fat	0·08 ,,	1·22 ,,
Carbo-hydrates	78·86 ,,	5·36 ,,
Ash	4·01 ,,	
Water	7·04 ,,	

Of all the milk adjuvants in the market, Mellin's is certainly the best. Its brown colour has been urged as an objection, but that has no weight with infants. It certainly errs in presenting an excess of carbohydrates, even though these take the form of dextrin and maltose, and it is thus too sweet to form a constant food from an adult standpoint.

Nestlé's Milk Food belongs to the second division of infant foods, those intended to be used instead of milk and therefore requiring nothing but water. This is a light brown powder with a milky odour and sweet taste. It becomes lumpy on standing, and is slightly deliquescent. One tablespoonful of the food is mixed with ten of cold water to form a creamy liquid, which is then boiled for a few minutes and cooled for serving. On allowing the liquid to stand for some days it sours and curdles like milk with separation of fat. It is difficult to estimate the solubility of the solid food, since the liquid behaves like milk on a filter. Iodine and the microscope show the presence of a fair amount of starch, which along with cane sugar makes up three-quarters of the total solids. The food is thus essentially a mixture of milk, sugar, and wheaten flour. My analysis works out thus:—

Nitrogenous	10·46	per cent.
Fat	4·38	,,
Carbo-hydrates	77·74	,,
Ash	1·80	,,
Water	5·62	,,

Horlick's Malted Milk resembles this last in being made with water only. The directions prescribe for infants under three months one to two heaped teaspoonfuls in four to eight tablespoonfuls of hot (not boiling) water; from three to six months this is raised to three to four teaspoonfuls in eight tablespoonfuls up to half a pint of hot water; from six to twelve months four to six teaspoonfuls in half a pint of hot water. The food is a light brown powder, having a sweetish taste and the characteristic odour of malt. Like Nestlé's Food, it runs through filter paper as a milky emulsion when mixed as directed. There is no starch found either by iodine or with the microscope, and the curd obtained by adding rennet is fine and flocculent, suggesting that of human milk. The chemical analysis shows—

Nitrogenous	22·56	per cent.
Fat	7·69	,,
Carbo-hydrates	63·48	,,
Ash	2·64	,,
Water	3·63	,,

The fat is practically milk fat exclusively; almost all the carbo-hydrates are soluble in water at 40° C., and about one-fourth of the ash consists of carbonates of soda and potash.

Allen and Hanbury have within the last six years or so brought out a new series of infant foods, which are highly spoken of and increasingly used. There are three in the "Allenbury" series. No. 1 is intended to be used from birth up to three months, No. 2 from three to six months, while No. 3 is a malted food intended for use from six months upwards. Measures are sold with the tins, so as to secure greater exactness than is given with the ordinary "teaspoon" reckoning.

No. 1 food is a creamy powder, having the taste and odour of fresh milk. Half an ounce (half-tablespoonful) is mixed with one tablespoonful of cold water to a thin paste; then hot water is added up to three ounces. Thus made up, it produces a liquid like milk so far as taste, odour, density, reaction, and microscopic appearances are concerned. On standing for a week this liquid sours like ordinary milk with separation of fat. My analyses of this food work out as follows:—

	Dry Food.	Made up for three months.
Nitrogenous . .	10·23 per cent.	1·78 per cent.
Fat	16·81 ,,	2·80 ,,
Carbo-hydrates .	66·06 ,,	11·10 ,,
Ash . . .	5·22 ,,	0·68 ,,
Water . . .	1·68 ,,	

Of the carbo-hydrates forty-two parts were milk sugar, the rest dextrin with a very little cane sugar. No starch was found. Substantially this is a cow's milk deprived of half its casein and otherwise "humanised," then evaporated to a powder *in vacuo*.

Allenbury No. 2 is also a fine powder, deeper in tint than No. 1, but resembling it in taste and odour. No starch was found by any test. When made up as directed, the liquid resembles milk to the senses, and, like it, separates fat on standing, and finally, after eight days, turns sour. Fully two-thirds of the dry food consists of carbo-hydrates, as in No. 1, but in this case milk sugar forms only one-half, the rest being malt sugar with 9 per cent. of dextrin, as before.

	Dry Food.	Made up.
Nitrogenous . .	9·86 per cent.	1·71 per cent.
Fat	15·04 „	2·49 „
Carbo-hydrates .	68·85 „	11·46 „
Ash	3·90 „	
Water . . .	2·35 „	

Allenbury No. 3 belongs to the class of malted foods, but is considered here along with the other products of the same firm. Like others of this class, it is a yellowish powder with a sweet taste and the odour of malt, easily perceived on moistening the food with hot water. According to the instructions, one tablespoonful of food is mixed with one teaspoonful of sugar and three tablespoonfuls of cold water so as to form a paste; then half a pint of boiling milk and water (1 : 1) is added, the liquid being served at blood heat. Iodine showed a large amount of starch, though in the prepared food this passes rapidly into dextrin and maltose. No milk sugar was found. The usual analyses gave—

	Dry Food.	Prepared Food.
Nitrogenous . .	9·94 per cent.	2·1 per cent.
Fat	0·98 „	1·6 „
Carbo-hydrates .	85·12 „	17·9 „
Ash	0·54 „	
Water . . .	3·42 „	

The selection of an infant food from these seems to be a choice of evils, the three outstanding foods being Mellin's, Horlick's Malted Milk, and Allenbury's No. 1, the last for preference.

If I were asked which of these artificial foods I should recommend for children, the answer would be, unmistakably, *None*. They are comparatively expensive, and in unskilled hands demand a care which might be better employed in adapting cows' milk; finally, they nearly all leave untouched the most vital part of the problem, the question of a pure supply of cows' milk, not to speak of the more excellent way of breast feeding.

Further, the little we know of the chemistry and physiology of digestion serves as a warning of increasing force against the assumption that the digestive tract of a healthy growing infant is in any way comparable to a glass test tube. After all, the infant is the real reagent, and one has no difficulty in adopting Burney Yeo's maxim, "Give the infant anything you like *provided it thrives*." Supervision and control by competent observers has given magnificent results in the Gouttes de Lait of Paris, and the curve of growth, as measured in weight, responds with wonderful sensitiveness to any sins of omission or commission on the part of the nurse.

Starch and maltose never appear in any mammalian milk, and the introduction of such foreign substances is justifiable only by the effect which they are said to produce by the digestion of casein. White's experiments,[1] however, show that this result is best attained with only 0·7 per cent. of starch, and, further, that the conversion of starch into dextrin and maltose *lessens* its effect upon the casein clot. These solid infant foods have been placed upon the market in order, for one reason, to bridge the differences between human milk and cows' milk It is therefore necessary to state those differences and to discuss various other means of reducing or overcoming them. Johanessen[2] gives the following summary analysis of the milk of twenty-five women twenty to forty-six years of age, primiparæ and multiparæ, but all with their infants in good condition, and sampled from the first to the third month of nursing:—

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[1] F. W. White, "Milk Coagulation and Digestion," *Jour. Boston Soc. Med. Sc.*, Vol. V. (December, 1900).

[2] Quoted Mauchamp, "Ster. Milk" (Paris). See also Starr, "Diseases of Children," Vol. I.

Proteids . .	0·06 to 2 per cent., average 1.
Nitrogen . .	13 to 23 cgm. per 100 cc.
Fat . . .	0·63 to 6·65 per cent.
Milk sugar .	2·55 to 9·77 ,,

The milk of primiparæ is richer in sugar, proteids, and fat; milk poorer in proteids is yielded by blondes and by women badly nourished, *e.g.*, on excess of starchy foods. Human milk is richer in fat between twenty and twenty-five years of age, richer in proteids between twenty-five and thirty, and richer in sugar above thirty.

Harrington, of Harvard University,[1] gives a series of analyses from the milk of fourteen mothers all healthy, and whose infants are all digesting well and gaining in weight:—

Number.	1.	2.	3.	4.	5.	6.	7.
Fat	**5·16**	4·88	4·84	4·37	4·11	3·82	3·80
Sugar . . .	*5·68*	6·20	6·10	6·30	5·90	5·70	6·15
Proteids . . .	4·14	3·71	**4·17**	3·27	3·71	*1·08*	3·53
Ash	0·17	0·19	0·19	0·16	**0·21**	0·20	0·20
T. S. . . .	15·15	14·98	**15·30**	14·10	13·93	10·80	13·68
Water . . .	84·85	85·02	84·70	85·90	86·07	89·20	86·32

Number.	8.	9.	10.	11.	12.	13.	14.
Fat	3·76	3·30	3·16	2·96	2·36	2·09	*2·02*
Sugar . . .	6·95	**7·30**	7·20	5·78	7·10	6·70	6·55
Proteids . . .	2·04	3·07	1·65	1·91	2·20	1·38	2·12
Ash	0·14	*0·12*	**0·21**	*0·12*	0·16	0·15	0·15
T. S. . . .	12·89	13·79	12·22	10·77	11·82	*10·32*	10·84
Water . . .	87·11	86·21	87·78	89·23	88·18	89·68	89·16

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[1] Morgan Rotch, *B.M.J.*, September 1st, 1902.

For all practical purposes, more especially on the industrial scale, we are restricted to cows' milk as a competitor with or substitute for human milk. Dr. Leeds[1] gives the following useful comparison :—

	Cows'.	Human.
Reaction	Feebly acid	Always alkaline.
Specific Gravity	1·0297	1·0313.
Bacteria	Always present	Absent.
Fats	3 to 6, aver. 3·75	2 to 7, aver. 4·13.
Lactose	3·5 to 5·5, aver. 4·42	5·4 to 7·9, aver. 7·0.
Proteids	3 to 6, aver. 3·76	0·85 to 4·86, aver. 2·0.
Ash	0·6 to 0·9, aver. 0·68	0·13 to 0·37, aver. 0·2.

König[2] further states that the proportion of casein to albumen differs widely in the two milks, as these figures show :—

	Human.	Cows'.
Casein	0·59	2·88
Albumen	1·23	0·53
Total proteids	1·82	3·41

That the casein of human milk is chemically distinct from that of cows' milk may be regarded as proved, while Richmond[3] and others maintain that human lactose also differs from bovine, and W. D. Halliburton states that the fats also differ.[4] It is worth noting from the figures quoted above from Leeds and Harrington, as well as from the more extensive analyses given by Starr, of Philadelphia,[5] that the differences between cows' and human milk are as nothing in comparison with the differences which are found between samples of human milk each from absolutely healthy mothers and sustaining healthy infants. In view of these figures, the preparation of infants' foods, of humanised milks, and the elaborate milk laboratories described recently by Morgan Rotch[6] would seem to be works of supererogation, unless it can be shown

[1] Leeds in Starr, Vol. I.

[2] *B.M.J.*, September 6th, 1902.

[3] Richmond, "Dairy Chem." (London, 1899).

[4] Schäfer's "Physiology," Vol. I., p. 133.

[5] "Diseases of Children," Vol. I.

[6] Morgan Rotch, *B.M.J.*, September, 1902.

conclusively that there are insuperable digestive or other physiological differences between cows' and human milk. When it is remembered that an infant of under twelve months is intensely plastic, accommodating itself to circumstances in a far higher degree than at any subsequent age, it may even appear that all these differences vanish.

The following is a resumé of the manipulations employed to make cows' milk more "human" in character.

Simple dilution with boiling water is the first means used, in the progressive ratios of:—

$$\frac{\text{Milk}}{\text{Water}} = \frac{1}{3} - \frac{1}{2} - \frac{1}{1} - \frac{2}{1} - \frac{3}{1}, \text{ according to age.}$$

In this way an infant imbibes enormous quantities of liquid, with unpleasant results. "Bottle babies are wetting babies," and surface irritation is a common result of the excessive irritation which follows. It would be much better to dilute for the first four days or so in the proportion $1 : 1$ or $1 : \frac{1}{2}$, after the first week $\frac{\text{milk}}{\text{water}} = 2 : 1$ up to the end of the sixth month. This gives a milk comparable with human milk in proteids, but poor in fat and milk sugar.

To rectify this poverty in sugar, Soxhlet adds 6 per cent. of lactose to the water used for dilution. Gautrelet mixes 1 of water with 1 of milk, and adds 25 grams of lactose per litre of the mixture. Heubner uses 1 part of lactose solution (12·3 per cent.) to 2 of milk, while Marfan originally proposed to add to the water used 8 per cent. of lactose, or even cane sugar, since invertin is present even in the fœtus.

With the total amount of mineral matter there is little difficulty, since cows' milk contains almost twice as much as human milk, and can therefore stand dilution to one-half (1 : 1).

To make up the deficiency in fat Marfan adds 1 per cent. of milk fat to the mixture; Ritter and Biedert both add cream; Epstein even proposes *lipanin*, which emulsifies readily in water, while Marfan has tried margarine, oil of sweet almonds, and glycerin, but without good results. No good method, he claims, has been found of making good the loss in fat, so he increases the sugar by compensation, and instead of using 8 per cent. of lactose, as stated above, he uses from 10 to 15 per cent., generally in the proportion two of cows' milk to one of a 10 per cent. solution of lactose. It will be noticed that cows' milk is already poorer in fat, and that this makes it poorer still. All these mixtures are understood to be prepared two or three minutes before using, which at once throws them out of court for ordinary domestic use; the average man, or woman either, is simply not capable of these nice adjustments of weights and measures.

To correct the acidity of cows' milk lime water is often added, but generally in excess, since only 5 per cent. is necessary to secure the proper degree of alkalinity. Many, however, seek to secure a further effect, viz., modifying the effect of gastric juice upon casein. Starr[1] points out that lime water contains only half a grain of lime per fluid ounce, and he therefore insists that at least one-third of the milk mixture shall be lime-water. He prefers to use 2 to 4 grains of baking soda or 5 to 15 drops of a solution of saccharated lime. Morgan Rotch, on the other hand, has recently shown that lime water has no more effect upon coagulation of casein than ordinary water, and further that albumen water (*e.g.*, barley water) has no practical value as a milk diluent.

With respect to the substitution of cane sugar for lactose, admitted by Marfan in his system of infant feeding, it has to be pointed out that while cane sugar is not so subject as lactose to lactic fermentation, it is more subject to butyric fermentation. In fact, *starch*, *dextrin*, *dextrose*, *inulin*, *and cane sugar*

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[1] L. Starr, "Diseases of Children," Vol. I.

feed the butyric ferment, while lactose does so only after complete hydrolysis, a fact which alone goes far to condemn nearly all the solid infant foods already discussed. Escherich[1] maintains that *Bacillus lactis aërogenes* is present in normal digestion, and forms from milk sugar an organic acid which inhibits the action of more noxious bacilli. In animals, and more especially in plants, cane sugar is a reserve form of nutriment; whereas it is probable that milk sugar plays a more active part. On Marfan's system there is certainly no constipation, diarrhœa, or vomiting, and the fæces are softer and yellower than with pure milk, though not quite like those of infants on the breast. On the other hand, these children do not increase in weight as rapidly as breast-fed children, but Marfan claims that they overtake these later on, when they are able to take pure milk. It is interesting to work out a few figures in connection with this dilution:—

In giving 500 grams of milk and water (1 : 1) we are giving only 7·03 grams of proteids, 8·05 of fat, 13·04 of sugar, and 1·50 of salts. Taking the total solids of human milk at 123 grams per litre and of cows' at 135 grams, then by using milk and water (1 : 2) we have only $\frac{135}{3}$, or 45, of total solids, or only 22·5 grams in 500 grams of milk, the daily supply. But 500 grams of human milk contain $\frac{123}{2}$, or 61·5, *nearly three times as much*, a fact quite sufficient to account for retarded growth. Marfan has now reduced his dilution to $\frac{\text{Milk}}{\text{Water}} = 2 : 1$, which still gives 45 grams of total solids compared with 61·5 for human milk. Dr. Variot, who has been obtaining wonderful results with sterilised milk, dilutes this with only one-third of water till the eighth week of life, by which time the stomach capacity of an infant has trebled, from 30 grams to 90.

These domestic or dispensary manipulations naturally lead to the "humanised milks" of commerce, nearly all of which aim at reducing the proteids of cow's milk, though some add milk-fat as well.

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[1] *B.M.J.*, September 6th, 1902.

In 1880 Enko prepared a mixture of meat juice or egg yolk with cows' milk so as to form an emulsion, which was then sterilised. Another of his methods was to add ½ per cent. of peptone to milk to get a fine curd, and this process has been revived by the use of Fairchild's peptonised milk-powder. The objection to all these anticipations of digestion is that it is of no use to keep a dog and bark oneself, and experience confirms the truth of this adage in the partial suppression of function which follows the habitual use of peptonised or otherwise predigested foods.

Vorcester[1] adds lact-albumen by beating up white of egg with milk, then adding water and sugar. This he does to rectify the poverty of cows' milk in albumen as distinguished from casein,[2] but that distinction is not reckoned to-day of any digestive importance. A. V. Meigs, of Philadelphia, gives a formula which is much used in the houses of the well-to-do in this country, viz.—

Cream	2 parts.
Milk	1 ,,
Lime water	2 ,,
5 per cent. sugar solution	3 ,,

This mixture gives an analysis of 4 per cent. fat, 7 per cent. sugar, and 1 per cent. proteids, while the lime water produces a fine curd.

MacClanahan's mixture is—

Cream	3 oz.
Milk	2 ,,
Water	10 ,,
Lime water	1 ,,
Lactose	7 drachms.

Finally, Morgan Rotch, of Boston, in the *Brit. Med. Jour.*, September 6th, 1902, pleads for milk laboratories or dispensaries, having for objects (1) to produce good milk at home; (2) to keep it good and of constant composition; (3) to modify it to suit each individual case. It must be made up by medical prescription from separated milks, wheys, and creams of varying degrees of strength, as detailed in the journal quoted, and it is not only double the cost of ordinary milk, but demands almost the addition of a new branch to materia medica and dispensing. With the milk laboratories of the United States, we are obviously very far away from plain cows' milk, and are dealing with a new product, a kind of chemical food, artificially built up.

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[1] *Boston Med. and Chir. Journal*, 1895.

[2] See König's figures already quoted.

Returning to the simple rectification of cows' milk, we may now examine the humanised milks of commerce. Recognising that the proportion of proteids in women's milk compared with cows' milk is $\frac{W.}{C.} = \frac{19{\cdot}20}{35}$, Vigier tries the action of rennet on half the milk as soon as possible after milking. The total milk is divided into two portions, so that one of them contains the same amount of proteid as both would of human milk. This part (a) is not treated. The other part (b) is allowed to stand; then its cream is removed and added to (a); then it is curdled by rennet, the curd is withdrawn entirely and the whey added to (a). Lastly, the whole is sterilised in bottles under pressure, which gives it a slightly brownish tint. This is essentially the basis of Allenbury's Food No. 1, milk minus excess of casein. It has to be pointed out that there is always a loss of fat, since some of this is always entangled in a casein curd, which also withdraws some sugar, so much so that it has been proposed to add 2 per cent. of lactose. Analysis of Vigier's milk gives—

Proteids	2·360	per cent.
Fat	3·750	,,
Lactose	4·104	,,
Salts	0·7	,,
Empyreumatic products .	0·810	,,

Of all the humanised milks of commerce, Gaertner's takes the leading place. He dilutes cows' milk with lactose water so as to get 2 per cent. of casein; then the milk is centrifugalised, being separated into a *Fettmilch* or *lait gras* with 35 grams of butter fat to the litre, and a *lait maigre*, which is rejected. The *Fettmilch* is then sterilised, assuming a yellowish colour, and the milk fat partly comes out of emulsion, gathering on the sides of the bottle to such an extent that after some days it is difficult to get the fatty matter completely emulsified. Lézard gives the annexed comparisons:—

	Human. Per cent.	*Lait gras.* Per cent.	*Lait maigre.* Per cent.
Casein . . .	1·7	1·8	1·8
Fat . . .	3·1	3·3	0·2

Marfan's analysis of this humanised milk shows a very close approximation to human milk, his only objection referring to price and the liberation of fat from emulsion:—

Casein	2·2 per cent.
Lactose	6·090 ,,
Fat	3·5 ,,
Salts	0·3 ,,

At the Vienna Congress of 1894 Escherich[1] reported that with Gaertner's milk the stools were more numerous and softer than with pure cows' milk, they had the acid reaction and golden yellow colour of those of breast feeders, and the curves of growth were almost identical. Keilmann[2] says it is well taken by infants; Thiemich and Papiewski[3] prefer it to sterilised milk; Popper[4] says "it gives very brilliant results"; Boissard, of Paris,[5] says that the curves of growth ascertained by daily weighings are sensibly the same either with sterilised milk or with Gaertner's. Almost the only unfavourable verdict is that of

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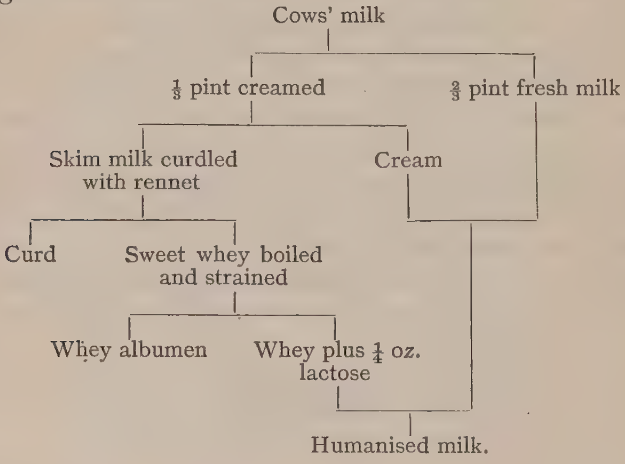
[1] "Med. Cong. Report."
[2] *Jahrb. für K.*, 1896, p. 312.
[3] "Gaertner's Milk in Dyspepsia," p. 372.
[4] *Archiv. f. K.*, Vol. XIX. (1895).
[5] *Rev. Philanth.*, No. 4, 1897.

Professor Monti, of Vienna, but recently severe attacks have been made on the side of bacteriology by Flügge, and on the medical side, as conducive to Barlow's disease, by several British and American physicians.

Dufour's humanised milk is interesting because he starts with milk-fat as the constant element in cows' and human milk, and therefore in the former he tries to diminish the proteids and salts, and to increase the sugar. The day's feeding supply is put into a Winchester quart (two litres) with a bottom tap, and is set for four hours so as to give cream above and *lait bleu* below. One-third of this latter is then withdrawn by the tap, and water added to make up the previous volume, this water containing 35 grams of lactose and one gram of common salt per litre. The whole is now mixed and sterilised. It will be observed that the soluble salts are halved in this process, and it has been found necessary to add occasionally one to two dessert spoonfuls of cream in order to keep the growth curve up to standard.

In my own work on "Food and its Functions" (1895) there is another domestic recipe for humanising milk due to Frankland, which may be shown in diagram thus:—



Fairchild advertises a "peptogenic milk powder" consisting of pancreatin lactose and alkaline milk salts, to be used as follows: Take half-pint of milk, half-pint of water, four tablespoonfuls of cream, and one large measure of the powder (measure supplied); heat on a stove, with constant stirring till the mixture boils, which should be in ten minutes. The peptogenic ferment is killed at 160—170° F., and the resulting product is alkaline and (?) sterile, as well as predigested. Their analysis gives—

Fat	4·5 per cent.	Total solids 13·8 per cent.
Proteids	2·0 ,,	
Lactose	7·0 ,,	
Ash	0·3 ,,	

Objections to this on the score of predigestion and household manipulation have already been stated.

The objection to all these domestic humanising operations is that they demand special intelligence and technical skill, under the surveillance and training of a medical man. But the very people among whom the infantile death-rate is highest, and who are therefore most to be benefited by an improved milk supply, are precisely those among whom such intelligent skill is not available, and who can least afford the expense which all these systems involve. The combination of ignorance and inertia which has substituted the tea breakfast for porridge and milk is the very last to be entrusted with such dispensing, and pending an educational crusade on the special subject of the care of infants all such infant foods must be supplied, if possible, ready for use, as to a people unable to tell their right hand from their left.

The following general criticisms are offered on the chemistry of all these humanising processes. In removing casein from cows' milk we also remove compounds of iron and phosphorus, in which human milk is rich, a fact having a very important bearing upon bone and teeth formation. Knöpfelmacher, of

Vienna,[1] actually proposed to make up this deficit by the addition of egg yolk, a return to Enko. Heat removes from cows' milk all the albumen (·2 to ·6 per cent.). It also removes some of the casein in the form of the skin which forms when milk is boiled, and which has now been determined as casein. In these ways the total proteids of cow's milk are diminished from 3·4 or 3·6 per cent. down to about 3 per cent. after sterilisation; there is therefore *only* 1½ *gram of casein per litre in excess* to be removed by all these complicated processes as compared with sterilised milk pure and simple. As a matter of fact, the objections taken to cows' milk refer, not so much to the excess of casein, but to the nature of the curd formed within the stomach, it being well known that human milk curdles in light flocculent masses, more resembling an acid curd, as against the solid compact curd given by cows' milk. Dealing with this later on, it is sufficient to meet the quantitative objection by recalling the variations of healthy human milk, not only in different individuals, but even in the same woman from time to time of age and nursing. From birth to the second month of nursing the casein and extractives in human milk run from 38 to 45 grams per litre, while from the second month on they run from 36 to 40 grams. Harrington's analyses (*supra*) show variations in casein from 10·8 to 41·7 grams per litre, and Dr. Variot, examining five samples of healthy human milk from the Trousseau Hospital, Paris, found a variation in lactose from 45·65 to 50·21 grams per litre, in fat from 30·7 to 31·5, and in proteids from 30·05 to 31·05. Louis Starr[2] is even more emphatic in emphasising the extreme limits of variation in healthy human milk as conditioned by such factors as race, age, number of births, duration of nursing, season of year, diet, etc., and again the question is forced, Is it worth while manipulating pure milk in these fashions to get rid of quantitative differences which are completely swallowed up by those which exist between perfectly normal human milks?

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[1] *Jour. Imp. Soc. Med.* (Vienna), January 7th, 1898.

[2] "Diseases of Child," Vol. I.

The question naturally arises, Is there any necessity for artificial feeding to the extent which prevails to-day? To this there can be but one answer. Dr. Bresset himself says that artificial feeding is only a makeshift. At the Rue Oudinot only 9·3 per cent. of mothers were physically incapable of nursing their children. Dr. Blacker, of University College Hospital, London, found no milk in only 24 women out of 1,000 cases, and insufficient milk in other 92,[1] and he maintains that mammary failure is to be regarded as *absolutely exceptional* among the London poor. Marfan's recent figures[2] taken from 200 cases in private practice, show that genuine incapacity for nursing occurs in *not more than* 10 *per cent.*, while two-thirds are capable of making good nurses, requiring no supplementary diet. Even in Munich, which has an infant death-rate of 50 per cent., and where only 17 per cent. of the infants are on the breast, Nordheim finds only 13 per cent. of mothers incapable, though 642 mothers out of 1,000 were not nursing at all.[2] In Bavaria and Würtemburg Bunge goes so far as to say that incapacity for nursing is tending to become hereditary. The situation is summed up in two quotations. Professor Pinaud says, "Every healthy mother ought to nurse her own child," but, on the other hand, Strauss, in a work on "Depopulation and Infant Rearing" (1901), says, "The mothers of to-day don't know the A B C. of their business."

It would therefore seem that an educational campaign is wanted to dispel ignorance and awaken conscience, and it seems to me that part of this may be overtaken in elementary schools. In the large towns—and it is there that the evil is most pronounced—all girls above twelve get two hours a week cookery lessons by teachers qualified under the Education Department. Some years ago, when invited by Sir Henry Craik to draw up a science curriculum for teachers of cookery, I laid special stress upon infant and invalid feeding, going so far as to demand profession of such a text-book as Burney Yeo's "Food in Health and Disease," but the curriculum is so overcrowded with purely memory work, recipes, and formulæ, that students in training cannot acquire the principles underlying this important branch of their work, and any examination on these lines is of the most perfunctory kind. The recent institution in Scotch schools of supplementary courses along domestic lines offers another opening of the same sort, but the weak link in the chain is the training of lady teachers, a matter capable of simple rectification. In continuation classes for young women these subjects naturally call for more attention, especially among the working classes, where we have to contend, not with the claims of fashion and "society," but solely with ignorance; these mothers are really seeking the good of their children, but, as has been said already, they don't know the A B C. of their business.

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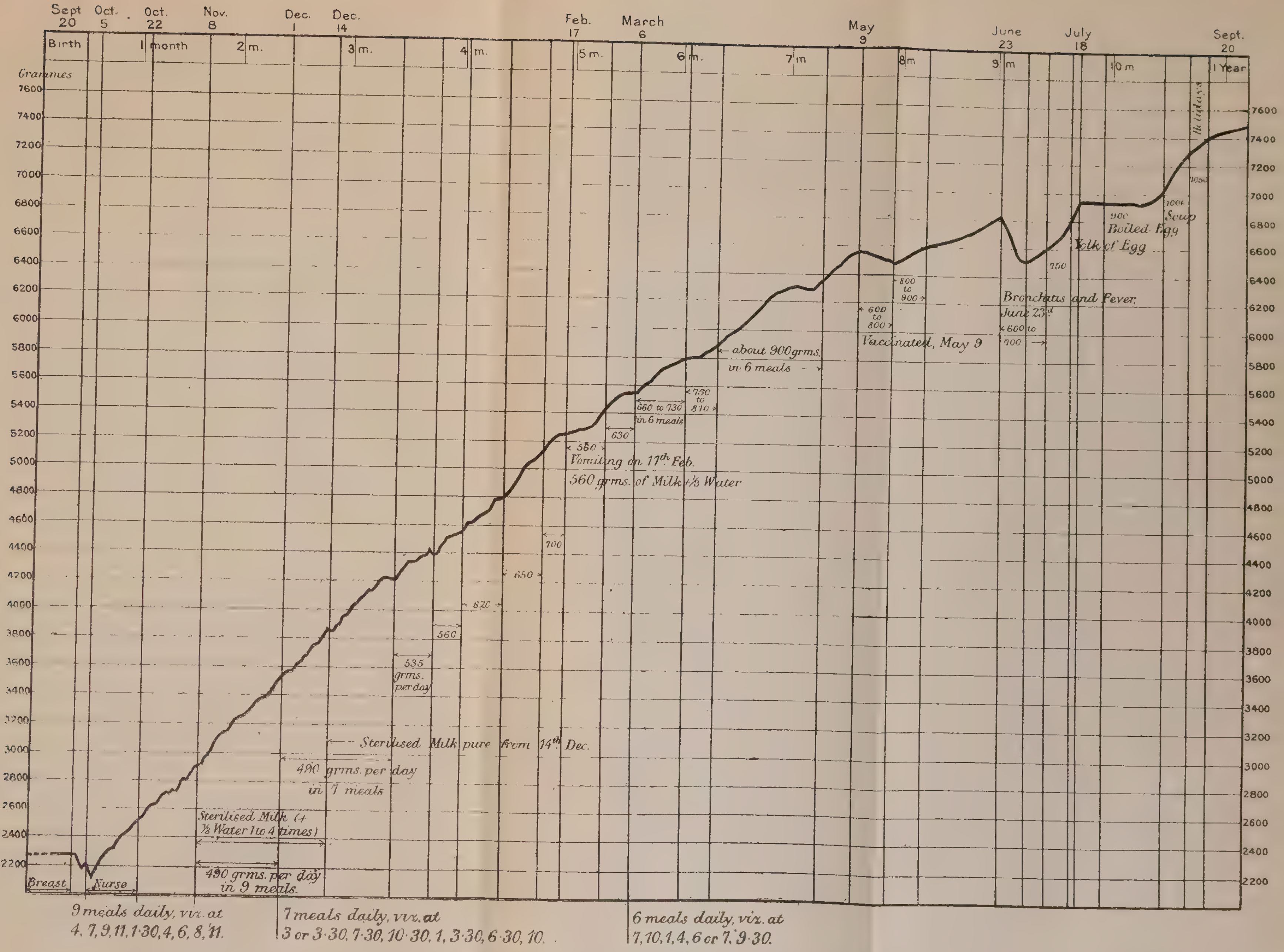
[1] *Med. Chron.*, 1900.

[2] *Rev. des Mal. de l'Enf.*, January, 1902.

Of medical men something more might be demanded. It is theirs to stimulate the conscience of indolent patients as to their maternal duties, to repress the introduction of patent foods and discourage their use. Unfortunately, very few medical practitioners are chemists, and the curriculum is so overcrowded as to leave hardly any room for a formal three months' course in dietetics, while food analysis is postponed to the post-graduate stage of D.P.H., reached by few. I think we are also ripe for the Roussel law in this country, or at least such a reading of the Food and Drugs Act as should render illegal, save under medical prescription, the administration of any solid infant food under the age of twelve months, as in France. The detection of



Graph of Weight for a Year. Daily Records, showing Number of Meals and Quantities. (Dr. Variot, Paris.)

[*To face page* 276.

pathogenic bacteria in humanised and so-called "sterilised" milk already lays them open to legal interference as being "unfit for the food of man."

Something might be done by our municipalities, certainly in workhouses, hospitals, dispensaries, and crêches, on the lines so successfully carried out in the Gouttes de Lait of Paris. In these dispensaries women are encouraged to submit themselves and their infants to medical surveillance by the fact that they get their supply of sterilised milk at much less than market price, 30 cents. per litre against 60 or 70 cents. for good cows' milk, besides gifts of feeding-bottles, clothing, etc., from the Assistance Publique. *Per contrà*, these establishments accumulate a valuable series of facts in the records of weekly weighings, which form a feature of the system, and which I hope to see inaugurated here. The example set by Paris and Glasgow ought to be made general, of issuing to each mother at the time of registering her child's birth simple instructions as to infant feeding and treatment generally.

The following resolution, submitted by Dr. Knight, was seconded by Dr. Moore: "That all preparations offered or sold as food for infants should be certified by a Government analyst as non-injurious, and each packet should contain its analysis."

MISS YATES called attention to the vital necessity for an educational campaign to remove ignorance and awaken conscience on the subject of food, calling attention to those foods which nourish completely at small cost. Dr. Sykes had said that a large amount of infant mortality was caused by the poverty of mothers, but it was not generally recognised that a large amount of underfeeding and mal-nutrition was due to lack of knowledge and lack of means. It would be well if they could substitute a breakfast of porridge and milk for one of tea and white bread. There was much apathy and indifference among all classes as to the wide choice of food. Mr. John Burns had said that one of the most urgent needs of a workman was a wife who could cook, but cookery classes gained a smaller attendance than ever. At an International Congress of Women, held recently in London, not a single paper was read on food, although the matter was of special national importance, and it was the duty of a woman to be able to cook. The report of the Departmental Committee on Physical Deterioration, also said there was much ignorance as to the choice of foods, and she therefore called the attention of the conference to a competition organised by the Bread and Food Reform League, an organisation of a voluntary character designed to call attention to the subject of dietary. This competition had been supported by many eminent medical men and those interested in the welfare of the people, and, without advocating any special system of diet, sought to teach the economical and nutritive value of much-neglected staple food, such as oatmeal, wheatmeal, lentils, and fruit and other vegetable foods. Ignorance of the right choice and preparation of food was destroying the people—the people perished for lack of knowledge. She hoped that the conference would direct attention to this question, which was a matter of life and death for generations to come.

Dr. Bostock Hill (Warwickshire) said that Dr. Knight's paper differed from most of the other papers which had been read in that it treated of a very technical subject, but all the same it raised several important points. The paper really came to this, that Dr. Knight warned them, in the light of chemical analysis, that most of the adjuvant foods are of such a composition that they cannot in any way replace the normal food of infants. Not only might they adopt that view, but he thought that they might go a little further, and say that they could not quite judge by the result of chemical work in a laboratory the whole question of the digestibility or suitability of foods when looked at from the mechanism of the infant digestion. The more they learnt from food analysis the more they found they had to learn, and while some little time back they might have been prepared to consider certain proteids and certain fats of equal value with others, the most recent investigation led them to the conclusion that there was something which we had not yet got to the bottom of, making any substitute for the real food of infants a less important one. He thought they must dismiss any starchy form of food, those described in a paper, as having no suitability at all. The digestive power of the young infant in the first few months of life was practically nil, and starch is not an infant food. But the question of the alteration or humanising of cow's milk raised one or two important questions. Dr. Knight said that there was great variation in the composition of human milk, there was variation in the milk of all animals, but there could be said to be an average, and the nearer they could get to the average the greater the probability that they would suit the human infant. Therefore he thought it was important to bear in mind one fact, *i.e.*, that they wanted as far as possible, while correcting cow's milk and its composition as regards proteids and carbo-hydrates, not to do anything that would diminish the fat ratio. He believed that in most of the difficulties that had arisen in the substitution of artificial foods for milk the trouble had been that practically there had been fat starvation of infants, fat being undoubtedly one of the most important constituents of milk. One article had hardly received due attention of late, and if it had, it had been an adverse attention, *i.e.*, condensed milk. There was no doubt that condensed milk, in the minds of the medical profession, was looked upon almost as anathema as a baby food. From the point of view of some condensed milk this was a perfectly correct view. Some popular brands, containing over 50 per cent. of sugar, were unfit for food. But there were pure condensed milks, and the addition of a certain proportion of water would give a normal unaltered preserved milk. In some conditions some children would thrive on these milks when prepared properly and cleanly, while they would not thrive on altered cow's milk. Cow's milk even would clot in the stomach when it contained too large a proportion of fat, causing digestive disturbance. The same condensed milk would clot in the stomach also, but in smaller clots, just like human milk itself, and in that way would produce much less irritation. Therefore, instead of damning all condensed milk as if it were all bad, they should consider that at times there might he an advantage from the use of properly condensed milk. One point he would very strongly emphasise, *i.e.*, human food in the normal man had one great advantage over all others—there was no opportunity for contamination or pollution, or those changes which largely tend to upset a child.

Dr. W. Savage (Colchester) did not think they should let it go out that condensed milk was in general a suitable food for infants, or that it was to be used without great precautions. In investigating the causes of infant diarrhœa his experience was almost the same as that of most other medical officers of health, that the proportion of children who die is very much greater among those fed upon condensed milk than those upon ordinary milk. The cause of this was not far to seek. It did not come in from the composition of the condensed milk, but because of the opportunities for the contamination of such milk. The general public and the uneducated public, among whom the deaths of infants from diarrhœa largely occur, did not realise that condensed milk will not keep, that it is readily contaminated, and also can become bacterially infected. They realised this with cow's milk, but not so readily with condensed milk. It was only necessary to look at the tins, with flies upon them, to understand the ease with which condensed milk could become polluted. Not only might the milk become infected, but the organisms could multiply in the milk.

Dr. S. Hallows said he was astonished that no paper had been read on infant feeding, especially as it was recognised that most infant deaths occurred from improper feeding. An infant was born healthy, but improper feeding would kill it. The previous day one medical man advised them to try dried milk. He tried it three and a half years ago; he fed dogs upon it, and had to stop it on account of rickets coming on. Some firms were advocating condensed milks, but such articles were not much good. They advertised them with a wonderfully fat baby, but a friend of his used that baby as an illustration against the condensed milk, for the fat was pathological fat, and the baby a most lovely specimen of a rickety baby. They might consider the method of multiplying milk, which made the fat globules ten times smaller than formerly, and these got through the stomach walls easily in consequence. He supported the resolution because, if these filthy concoctions were sold, it was as well the public should know what they were and how prepared.

The resolution was then agreed to.

THE INCREASE OF THE POWERS OF LOCAL AUTHORITIES WITH REGARD TO MILK SUPPLY.

By A. K. CHALMERS, M.D.,

Medical Officer of Health, Glasgow.

The object of this discussion is to consider what alteration in existing legislation seems to be necessary to enable local authorities to ensure the provision of a pure milk supply.

At present milk supplies are controlled by the Dairies, Cowsheds and Milk Shops Order, and by certain clauses in the Public Health and Food and Drugs Acts.

These are of general application, but the last named, as applied, has usually reference only to variation in the normal constituents of milk present in a particular sample, whilst the clauses of the Public Health Acts aim at preventing the sale of milk which has or is likely to become infected.

In addition several larger towns in England possess further powers on the lines of the Manchester Milk Clauses. These deal with specifically infected milk, and their object is therefore akin to that of the clauses of the Public Health Act. They refer to tuberculosis of the udder; and in Scotland there are the somewhat parallel provisions in certain adoptive clauses of the Burgh Police Act, 1903.

It is therefore solely through the provisions of the Dairies Order that local authorities are enabled to deal with the sanitary condition of milk premises, and to take such steps as seem likely to prevent the infection or contamination of milk.

It is unnecessary here to consider in any detail how these purposes are to be accomplished. It is sufficient to note that in general their aim is to secure the health of the stalled animals and cleanliness in the production and distribution of milk. Certain structural and sanitary requirements must be observed, and a prohibition is placed on the handling of milk by persons suffering from infectious disease. Contamination, so far as it is likely to arise from structural defect in the premises, is to be prevented; and the milk of animals suffering from certain diseases is to be withheld from sale.

Chiefly, however, the Order places in the hands of local authorities power to frame regulations for controlling the conditions under which milk is produced and sold within their several districts. Everything, therefore, which tends towards stringency in the form, or efficiency in the application, of these regulations depends on the view taken by a local authority of its responsibility. Some make considerable effort, others are satisfied with a less exacting standard; in others the power to regulate has been left in abeyance.

Through the courtesy of the Local Government Board for Scotland I am able to introduce here a statement of the number of local authorities who have there availed themselves of this power.

INFORMATION AS TO THE NUMBER OF LOCAL AUTHORITIES THAT HAVE ADOPTED DAIRY REGULATIONS IN SCOTLAND.

Local Authorities.	Landward.	Burghal.	Total.
Number of local authorities in Scotland	**107**	**250**	**312**
Number of local authorities that had regulations in force *prior* to the coming into operation of the Dairies Order, 1899 . . .	79*	87†	166§
Number of local authorities that have adopted regulations *subsequent* to the coming into operation of the 1899 Order	3	52	55
Total number of local authorities that have dairy regulations presently in force	**82**	**139**	**221**

* Of these, seven revised their regulations after the coming into operation of the Order of 1899.

† Of these, fourteen revised their regulations after the coming into operation of the Order of 1899.

§ Of these, twenty-one revised their regulations after the coming into operation of the Order of 1899.

In a similar manner I am indebted to Mr. Power, of the English Local Government Board, for the following figures, which are referable to England and Wales:—

Sanitary Authorities.	Total Number.	Number adopting Regulations.
Urban District Councils, including Town Councils	1,134	804*
Rural District Councils . . .	657	364*
	1,791	1,168

* These figures are approximate.

LIMITED SCOPE OF PRESENT REGULATIONS.

In their general scope it would appear that these regulations may be made wide enough reasonably to cover every risk to milk; and with such knowledge of the sources of contamination as the framers of the Order possessed this undoubtedly was so. But a moment's reflection on the history of dairy legislation will make it clear why, despite all our provisions, there should still be a demand for increased power of control. In point of time the conception that disease might be spread by water anticipated by a few years the parallel conception that it might also be spread by milk. And as the diseases which afforded the earlier illustrations in both cases were of the major epidemic sort, our dairy legislation was devised against disease in the concrete, and on the assumption that the evidence of its presence was written in characters which could not be mistaken. So that when the Dairies Order prohibited anyone sick of an infectious disease from handling milk it had in view the dairyman's family, and the more obvious risks arising from the storing of milk in vessels kept in a living apartment; the cleansing of milk vessels in a polluted water supply, or the alternate use of the milk scullery as a domestic washing-house. And as with diseases of the dairyman, so it was with diseases of the dairy stock. Cattle plague, pleuro-pneumonia, and foot-and-mouth disease represented, until quite lately, the only diseases of cattle which debarred their milk from sale for human food, and, although tuberculosis of the udder has now been added, we do violence to our knowledge of the laws both of physiology and of disease by assuming that every form of acute febrile disease in a milk animal, other than these named, is without pathological significance or can fail to influence the character of the milk yield while the disease continues. For example, septic and acute gastro-intestinal affections in animals, non-tubercular affections of the udder, teat eruptions, &c., have still no place in dairy legislation, although all of them have at one time or another been demonstrably associated with disease in the milk consumer.

All this notwithstanding, it is not my intention to suggest that dairy legislation has failed to accomplish considerable reform where local authorities have been disposed to make full use of the powers possessed.

But during the years which have elapsed since the Order was framed the whole pathology of dirt has acquired a new significance, and its bearing on the causation of disease has rapidly outstripped our legal phraseology.

Justice, indeed, requires us to admit that local authorities have as a rule failed to make useful application of this knowledge; and it is to some of the larger milk companies in this country and abroad that we must go for illustration of successful application, to the technique of the dairy, of the teachings of the research laboratory. For while administrative effort has almost too exclusively confined itself to producing reform in the structural environment of the milk supply, and only, in the actual presence of disease, has concerned itself to any great extent with the habits of the milker, commercial companies have shown us that the hygienics of the milk question depend quite as much on intelligent handling of the milk at and after production. It is the application of the surgeon's conception of cleanliness to the conditions of the milk traffic which these companies have taught local authorities; it is the adoption of measures to prevent contamination in a sense very different from that which obtained when the Dairies Order was framed which is so desirable—so necessary, in fact; and it is this which I venture to suggest is impossible of attainment through the operation of any regulations which the present Dairies Orders enable us to make.

By these channels we have reached the conception of a pure milk supply, free not only from the germs of specific disease obtained from the animal or its attendant, but free also from those other elements of contamination which lurk in the dust of byres and in every milking pail, milk churn, and dish through which the milk passes on its way to the consumer. I do not forget that it has been urged that the greater contamination of milk only occurs after it has reached the household of the consumer; but as evidence that the purveyor does not accept this as a satisfactory explanation of all the impurity present we have only to remember the widespread use of chemical preservatives, and the rapid growth in recent years of the practice of commercial pasteurisation.

Both have one aim, and both, moreover, by implication range the purveyor among those who affirm that milk requiring either has been produced under conditions which are defective.

Need for Extension of Dairies Order.

It is pertinent to ask why local authorities have failed to bring administrative requirements into line with this advancing knowledge of the sources of milk contamination. Of recent years the question of tubercle in dairy herds has almost excluded from view other important phases of dairy legislation. It explains also, I think, the inaction which we are here considering; for the Dairies Order is defective, and local authorities are inactive, not altogether because of unwillingness, but from inability to accomplish what is so necessary. In particular the Order is too restricted in its definition of disease as affecting animals, and fails probably most of all in the optional character of the provision contained in its article 13, by which local authorities are enabled to regulate the conditions of the milk traffic. Moreover, the scope of the regulations is limited, and does not include the food or toilette of the animal, or provide for the withdrawal from sale for food of milk obtained from animals undergoing treatment by drugs which are known to prejudicially affect the character of the milk.

I suggest to you, therefore, that in any new Dairies Order disease in animals should, for the purposes of the present article 15, include every general disease accompanied by fever, all acute affection of the gastro-intestinal tract, and inflammatory affections of the udder and teats.

Regarding teat eruptions, there is, I think, evidence to suggest that even a superficial sore may add to the milk, not only the morbid products which are common to all diseased surfaces, but may afford a suitable culture field for bacillary growths with pathogenic properties; and I have before me notes of a recent series of sore throats presenting all the clinical features of diphtheria, and occurring contemporaneously with the presence of such sores as I have indicated, from which an organism morphologically resembling that of diphtheria, but failing in the final test of virulence to animals, was recovered by culture.

Notification by the cowkeeper of disease among his herd has its advocates, but the almost universal neglect of the parallel obligation imposed on the householder under the Infectious Disease (Notification) Act does not suggest that notification by the cowkeeper would be better observed. The more hopeful method would seem to be frequency of inspection, followed by a penalty on conviction of any contravention of the regulations, and the destruction of the animal when suffering from any infectious disease likely to affect its milk permanently.

But it may be asked whether regulations of the character we are now considering are likely to ensure a milk supply which will reach the consumer in a fresh and wholesome state.

The technique of the modern dairy includes filtering and cooling, sometimes bottling and sterilising, and it is suggested that milk treated efficiently by either method can only be supplied at a prohibitive price. This can be true only so long as a fractional portion of the supply is so treated. Extend the demand for it, and by co-operation the economic difficulties of the milk producer on a small scale will disappear. And the way to extend the demand is by the creation of an educated public opinion such as this Conference will, we hope, do something to further.

But more would seem to be necessary. Administratively the principle of empowering one local authority to interpose between another local authority and its responsibilities is, I think, open to grave objection, and is indeed only excusable on the plea of hopeless remissness. But there can be no doubt that the milk consumer is likely to be more critical of the conditions of production than the producer, and hence regulations and customs deemed satisfactory by a rural authority may quite reasonably fail to gain acceptance in a neighbouring town. If, then, the larger neighbours are to maintain a policy of non-interference, are they to remain inactive?

Is it not the case that knowledge regarding the dust impurities in milk is steadily pointing in the direction of a bacterial standard of purity. We know that while some organisms are inoffensive, others are highly offensive in origin, and that in some countries summary destruction follows the discovery of any milk found on sale at a temperature exceeding a given maximum?

I suggest to you that regulations of this character would form a most efficient stimulus to reform in dairy methods.

On such lines indeed we must, I think, ultimately reach the provision of a pure milk supply, but meanwhile voluntary action on the part of local authorities would accomplish much.

We have before us illustration of the success which has attended a system of certifying milk produced and distributed under rigidly hygienic conditions, and were the local authorities of the large towns in this country to agree upon voluntary registration of such dairies as observed similar precautions, and to issue certificates which would form a guarantee of the character of the milk, and of the conditions under which it was produced and distributed, we should, I imagine, have begun to level up the whole standard of our milk supplies.

I have said nothing regarding the difficulty which certain corporations have experienced in financing infants' milk depôts.

In Scotland this difficulty has not been felt, and although the Milk Depôts (London) Bill of last year, which would have legalised the establishment of milk depôts by the metropolitan boroughs, was dropped, the principle has, I believe, been embodied in the Borough of Woolwich Act of this year.

The Sediment in Milk.

As illustration of the impurity, which it should be the object of regulations to prevent, I submit a statement prepared by Dr. R. M. Buchanan, Bacteriologist to the Health Department of Glasgow, of the microscopic and bacterial characteristics of some sediment obtained from milk produced on farms where considerable effort is made to conform with existing regulations.

This fact explains, I think, the relative smallness of the volume of sediment recovered, although it scarcely affects its character.

It is our practice in Glasgow to pass all the milk supplied to the Infants' Milk Depôt through an electrically driven separator, and the sediment of 150 gallons was examined on several successive days. Dr. Buchanan's description is as follows :—

"The five deposits submitted consist of repulsive pultaceous masses composed of greyish dung-like material, interspersed with hairs and covered with dirty greyish slime. Two of the samples were selected for detailed microscopical and bacteriological examination and presented the following appearances :—

Microscopical Examination.

"(*a*) *Greyish dung-like material* showed many dust-like particles of an indefinite nature—black, yellow and brown; fragments of vegetable fibres—a few colourless but majority yellowish-brown, and some apparently partly digested; some semi-crystalline translucent masses varying in size; squamous epithelial cells in large number; leucocytes a few, fat globules a few, and hairs a few.

"(*b*) *Dirty-greyish slime*—consisted mainly of leucocytes, numerous fat globules, and fatty particles. Squamous epithelial cells were abundant, but scarcely any dust particles or vegetable fibres were detected. Bacteria were numerous as compared with the number in the greyish material, and comprised cocci, short bacilli and a few streptococci."

BACTERIOLOGICAL EXAMINATION.

	Deposit of 29th May, 1906.	Deposit of 31st May, 1906.
Bacterial content	Estimated at 145,080,000 per gramme.	Estimated at 142,200,000 per gramme.
Bacillus Enteritidis Sporogenes .	Absent in 1 mg.	Absent in 1 mg.
Bacillus Coli	Absent in 1 mg.	Absent in 1 mg.
Coliform Bacilli (*Bacillus Lactis Aerogenes* type).	Estimated at 2,520,000 per gramme.	Estimated at 420,000 per gramme.

This sediment on being weighed by Mr. Harris, Corporation Chemist, was found to average 135 grammes, or 4·76 ozs. when moist, whilst on drying at 100° C. it was reduced to 3·01 ozs.

This represents over the total volume of milk an average of 8·8 grains of dried material per gallon, or rather more than one and a half grains per pint.

DR. A. K. CHALMERS moved: "That the Dairies, Cowsheds and Milk Shops Order is defective, and that any amendment should extend the definition of diseases applied to animals, and should make the provision of regulations by local authorities compulsory. That the scope of the regulations should be extended to cover dirty milk and should enable local authorities to prohibit the sale of any milk which fails to comply with the conditions of purity agreed upon."

Dr. Killick Millard (Leicester) seconded the resolution, and said that he did not think that any who had difficulty with the milk supplies would be unable to support the view expressed. Those who had seen milk cleaned by means of the new centrifugalising machines would be astonished at the demonstration of the impurities which find their way into milk. When milk was dealt with on a large scale it was perfectly astonishing to see the amount of manure removed from it. There was great contamination of milk under the ordinary conditions of milking. The cooling of milk was of great importance if it was to be kept sweet.

Dr. S. Hallows said that for the last five years it had been his hobby to pay private visits to farms, not those owned by the large dairy companies, but those owned commercially by farmers and dairymen. He was a paying guest at one farm, and one morning observed the chambermaid bringing down the slops from the bedrooms. Being taught by Sir Henry Littlejohn to be a keen observer, he noted that pail had a particular mark upon it. Looking on at the milking in the afternoon he observed that same pail being used. Another thing was what was called a wet milk. Now, generally the farm labourer went to bed dressed, and got up in the morning, and, generally without washing, went away to milk the cows, wetting his hands in a little drop of milk in the bottom of the pail, and continued milking. That was called a wet milk. Farm hands often suffered from diseased hands, ringworm mostly. Cobwebs could often be seen in the cowsheds, and the farmers never thought it necessary to clean them away. Cows in farms were not at all well groomed, and the cow was always swishing her tail about, so they could imagine what was flicked into the milk-pail. Then the carriage of the milk by rail was extremely defective, as anyone could see who watched the hundreds of barn churns at the great termini. The men, no matter if suffering from a diseased mouth, would often have a drink. When the milk got to the small milk shop it was liable to still further pollution in the large open pans, with perhaps a tray of bloaters on the top. People came in, perhaps from an infectious case in the neighbourhood, and had a little chat with the shopkeeper across the milk pan. There was a strong case for registration and proper control. It was not an uncommon thing to see a milkman serving milk from a cart drawn up behind a dust-van. He would like to know if it were a fact that milk refused in Salford was sent up to London.

Dr. Lawson Dodd supported the resolution, and said that Dr. Chalmers had shown that the present law is entirely defective and inadequate, that dirt, some diseases, and the question of cooling and transit were at present absolutely untouched by legislation or by administrative control. There was also another point to bear in mind: although he entirely supported all Dr.

Chalmers had said, he would like to emphasise to the meeting where we are being led by this stiffening up of milk legislation. Suppose they did improve the law up to the highest possible standard, had they under present circumstances any machinery for carrying out the law? If they read the letter in that day's *Morning Post* by a medical officer of health in London, they would see there stated the extreme difficulty which medical officers of health, especially in rural districts, had at the present time in carrying out the Dairies and Cowsheds Order in the presence of a hostile council. If they were going to raise the standard much more, they would find the tenure of a medical officer of health in rural districts would become a very slender thing, and the medical officer would have to make the law still more a dead letter than it was at the present time. Another point to bear in mind was this: if they raised the standard of milk administration, would they also raise the price? Raising the price of the milk supply in this country was a real and serious question of public health, because if the price was raised ½*d*. or 1*d*. per quart throughout the community, it would be impossible for a large section of the population, and that section which most required milk, to get milk for their dietary at all. He wanted to emphasise the fact that the development of the control over milk supplies in his view would be similar to development of public administration in water. Water and milk had always been closely related in more senses than one, too closely related from a public health standard frequently. If a century ago they had the water supply of this country from numerous contaminated sources, held as profitable sources of income by men of small knowledge and capital, there was almost an analogous condition of things in regard to the present milk supply. His own view was that if they were going to do anything at all to really solve the problem of milk supply, they would have to bear in mind that the townspeople were consumers and the rural populations were producers, and the rural population had said quite frankly that it was not going to administer the Dairies Order which the townsmen mistakingly think they could force upon the country. Exactly the same thing happened in regard to the water supply. Townsmen wanted to get control of the gathering-grounds in the rural districts and had not done it. There had been water epidemics, but there were not many large milk epidemics, but there was constant disease and death as a result of the present system of milk supply. He was convinced that until the community took over the milk supply, as it had successfully taken over the water supply, there would be no complete solution of the problem at all. Many of these ideas had been put forward in the past by men like Edwin Chadwick, and it was surprising that if to-day men followed them in advocating such steps as were advocated many years ago they should be regarded as extremists. This question should not be looked upon from the standard of the economical faddist, not merely the economical standard of individualism, but should be regarded from the public health standard, and townspeople in order to improve their milk supply would have to own their milk supply. He was fully convinced, in the light of much that Dr. Chalmers had said, that the question of organisation was at the root of the whole thing, and organisation could only be effected by taking over the whole supply of a town under one authority, and not only the organisation but the commercialism of such supply are all important, taking into consideration, first, the public health requirements of cleanliness, and, secondly, the financial demands of the case.

Dr. W. Savage (Colchester) also supported the resolution, and said that too long had we confined attention in the milk supply to questions of the ordinary notifiable diseases and tuberculosis. But the time was ripe for dealing with questions which were much more subtle and distinctly more harmful. He quoted an instance of an outbreak of sore throat, there being six hundred persons affected, traceable to an infectively-diseased udder of a cow. When the milk from that source was stopped, the epidemic stopped. In this and many other directions fresh legislation was required. He did not quite follow Dr. Chalmers as to the levelling up of the Dairies Order, because what was the use of making that Order more stringent if it were not carried out? Many of the rural authorities who administered the law were directly interested in the milk trade, and how could they be expected to carry out further legislative measures which were not for their own benefit but for the benefit of a perhaps far-distant town? Surely human nature being what it is, that could not be expected. He agreed that there must be more frequent inspection, that was the main thing; but he thought they would have to adopt the principle that the people who consume the milk must themselves inspect it. This was of course a very difficult matter, but he believed that it could be carried out, not giving them power to penalise producers, but to decree that milk produced under harmful conditions should not be sold within their area. If this were done, no doubt with communication between medical officers of health and the adoption of a black-list, so to speak, the market for the milk would be restricted, and it would be seen that the only chance would be to conform to regulations which the urban authorities would doubtless make. In that direction they might at once look for improvement, but that additional powers are needed was agreed by everybody.

Mr. Short here desired to move a resolution in favour of the municipalisation of the milk supplies, but it was agreed to take this as a separate motion.

Councillor R. Caton (Liverpool), speaking as to tubercle in milk, said that in Liverpool every cow was inspected, but with regard to milk coming from different parts of the country they were in a different position. There was no control at all there. Samples were taken, and if tubercle was found the veterinary was sent out, and invariably the tuberculous udder was discovered. That was a useful method. As regards the large municipalities, he was afraid the idea of establishing a municipal milk supply was really impracticable, though he wished it could be done. He was personally opposed on various grounds to municipal trading, but he wished to point out that the National League for Physical Education was now conducting a very careful investigation into this question.

The resolution was then carried *nem. con.*

Mr. Short then moved: "That in the opinion of this conference it is desirable that local authorities should municipalise the whole milk supply in order to ensure a pure and wholesome source of infant food where artificial food cannot be avoided, and so diminish the enormous waste of infant life due to contaminated milk."

The words "whole of" were ruled out of order, and the motion, as so amended, was placed before the conference.

Mr. Short said that this was perhaps a counsel of perfection, and there might be enormous difficulties in the way of practically adopting the principle of the resolution in large towns. There was also an objection to the extension of municipal trading, but if 80 per cent. of the problem of infant mortality was bound up in the question of improper and contaminated food, it was surely a question for consideration. All who had investigated infant mortality had come to the conclusion that feeding was largely responsible for the evil. Mr. John Burns had promised that he would introduce a little Bill for legalising milk depôts. That was an indication that the Local Government Board were waking up to the necessity for supplying pure milk in some form or other. Pure milk would naturally be better than sterilised milk. The conference had passed resolutions dealing with 20 per cent. of the causes of infant mortality, and he wished it to pass a resolution dealing with the one great cause. Perhaps it was somewhat extreme, but they should aim at ideals, or, as Emerson said, "Hitch your wagon to a star." He believed that municipalisation was the only effectual way of solving the problem of the milk supply.

Mr. Lawson Dodd seconded the motion.

On being put, 19 voted in favour, 30 against, and it was accordingly declared lost.

In the absence of Dr. J. Spottiswoode Cameron,

The Mayor of Huddersfield moved: "That in the opinion of this conference immediate legislation is required to enable the sanitary authorities to establish and support depôts for the supply of pure, modified, or sterilised milk, and to pay any cost out of monies available for public health purposes." He said that there was a suggestion that if this power were now asked for they would get it.

The motion was carried unanimously.

THE OPERATION OF THE MIDWIVES ACT IN ENGLAND, WITH A VIEW TO ITS EXTENSION TO SCOTLAND AND IRELAND IN RELATION TO INFANTILE MORTALITY.

By MARGARET MERRY SMITH, M.B., D.P.H. (Edin.).

The Midwives Act, 1902, was framed to secure the better training of midwives, and to regulate their practice.

The administration set up under the Act consists of a Central Midwives Board and Local Supervising Authorities, the local authorities being county councils or county boroughs. The local supervising authority may delegate, with or without restrictions, any powers or duties conferred upon them by the Act to special committees, or, in the case of county boroughs, to the district councils. Women are eligible to serve on such special committees.

The Central Midwives Board is empowered to frame rules which define the conditions of admission to the Midwives Roll; the course of instruction which midwives must receive, and which regulate, supervise, and restrict within due limits their practice.

They have also power to decide upon the removal from the roll of the name of any midwife who disobeys these rules, or who is guilty of other misconduct.

The local authorities are required to exercise general supervision over all midwives practising within their area, and to investigate charges of malpractice, negligence or misconduct, and should a *primâ facie* case be established, they are required to report the same to the Central Board.

The actual supervision is carried out by the officers of the Authority. Usually the Medical Officer of Health is appointed to carry out the duties with special assistants in some cases.

In the rules framed by the Central Board the following have special reference to the care of the new born child : —

" The midwife shall be responsible for the cleanliness and should give full directions for securing the comfort and proper dieting of the mother and child during the lying-in period, which shall be held, for the purpose of these regulations and in a normal case, to mean the time occupied by the labour and a period of ten days thereafter." Rule E (11).

" A midwife must decline to attend alone, and must advise that a registered medical practitioner be sent for whenever, after delivery, the progress of the mother or child is not satisfactory, but in all events upon the occurrence of the subjoined conditions :—

" 1. Injuries received during birth.

" 2. Obvious malformations or deformities, not inconsistent with continued existence.

"3. Concealed malformations—incapacity to suck or take nourishment.

" 4. Inflammation to even the slightest degree of the eyes, eyelids and ears.

" 5. Syphilitic appearance of the skin in certain parts.

" 6. Illness or feebleness arising from prematurity.

" 7. Malignant jaundice (*icterus neonatorum*).

"8. Inflammation about the umbilicus (septic infection of the cord). Rule E 17 c. (2)."

She is also required to pursue this course in certain defined conditions when in attendance on pregnant or lying-in women. These conditions include many which have direct influence on the unborn child. All the rules framed to secure that adequate precautions are taken by midwives while in attendance on lying-in women have an important bearing on the prevention of infantile mortality, inasmuch as they diminish the risk of puerperal sepsis and the gynæcological complications which result therefrom.

When a registered medical practitioner is sent for the midwife must state in writing the condition of the patient and the reason of the necessity for medical advice. A prescribed form must be used and a copy of this must be sent to the local authority within twelve hours.

The duties and responsibilities of the midwife are therefore clearly defined, and adequate provision exists for regulating and supervising their practice if local authorities choose to exercise their powers.

The Inter-Departmental Committee on Physical Deterioration called special attention to the powers thus possessed by local authorities, and sent up the following recommendation:—

"The Committee desire to call the attention of local authorities to the provisions of the Midwives Act, 1902, which may be made an instrument of the greatest utility for the dissemination among mothers of proper knowledge and practical advice."

In their report we read elsewhere: "It is obvious that, as women trained under the Act take the place of the illiterate, incompetent persons that very generally look after the poor at this critical period of their lives, a great opportunity is offered for giving mothers the information wanted and providing the newly-born infant with a fair start."

In order to arrive at some conclusion regarding the probable influence exerted by midwives, it is necessary to discuss their position at the present moment in England generally, and in large industrial centres in particular.

Twenty-two thousand three hundred and eight women were registered by the Central Midwives Board as midwives up to the end of March, 1905. Of these women 12,521 had been in *bonâ-fide* practice in July, 1901, and therefore were able to secure registration provided a certificate of good character were supplied. From a return issued by the Central Midwives Board it appears the number of midwives in actual practice is as follows:—In County Council districts, 9,100 (of these 5,968 are *bonâ-fide*); in County Borough districts, 3,155 (of these 2,147 are *bonâ-fide*).

I have given the proportion of *bonâ-fide* women because it is necessary to realise that many of the midwives at present are very ignorant and illiterate, and are quite incapable of imparting to mothers sound advice on the care of children.

While we must look to the trained midwife of the future for real help, the training of existing midwives should not be neglected, as a very large number of births take place annually under their care.

I regret I am unable to give the actual number of births which took place during 1905 in England and Wales under the care of midwives, but 465,000 may be taken as an approximate number. This figure is based on a comparison with Manchester returns, and is roughly 50 per cent. of the total births registered.

The number given is probably too small, yet it brings home very forcibly the far-reaching influence which midwives exert.

The statement has been made that the percentage is 60 to 70 per cent., and is as much as 80 to 90 per cent. in many of the poorer districts.

In Manchester between 10,000 and 11,000 births out of 18,325 registered in 1905 were attended by midwives.

The work of training these illiterate women may seem somewhat hopeless, but good results in many cases follow repeated individual practical instruction, especially if energetic action is taken by the local authority.

In many areas local authorities have made no use of their powers. It is necessary to bear this in mind, as it means that the ignorant, illiterate midwife continues to practice in the same old way. An idea of the present position may be obtained from the following return, issued by the Central Midwives Board:—

Conditions under County Councils.

Twenty-six counties in England and Wales have appointed women inspectors of midwives. In some other counties the duty of inspection is carried out by the county or district medical officers alone.

Of the sixty-two administrative counties of England and Wales thirty-three have no medical executive officer. Ten of the thirty-three counties have delegated their powers and duties to the urban and rural district councils within their respective areas. Many of the district councils have refused to accept the duties thus delegated.

Conditions in County Boroughs.

Forty-two have made no appointment of inspector of midwives. In twenty-eight of the remainder the medical officer, or a female sanitary inspector on his staff, has been appointed to perform the duties.

Liverpool and Cardiff appear to be the only places at which it has been found possible to make arrangements for the payment of medical practitioners sent for in emergencies under the provisions of the Board's rules. Manchester has, however, practically completed arrangements for making such payments.

In several of the large cities where the infantile mortality is high, provision has been made for adequate systematic inspection of midwives, and special instruction is given, *e.g.*, Birmingham, Liverpool, Sheffield, Leeds, Hull, Bradford, and Manchester, while in others no such provision exists.

It is moreover important to realise that even where systematic inspection work has been carried out, it has been almost impossible during the past year to do more than train existing midwives in general habits of cleanliness and antisepsis. General instruction has been given in the care of infants, and printed instructions have been issued by some authorities.

In Manchester, at any rate, it was impossible at first to give much instruction to midwives in the care of infants. A special pamphlet, on the care of infants during the first ten days, was issued by the local authority in the beginning of 1905. During inspection visits this was gone over carefully with the midwives.

For the past few months special attention has been given to the subject when visiting midwives, and detailed instruction has been given in all matters relating to the hygiene of the new-born child. An attempt has been made to interest the midwives in the subject and to arouse within them a feeling of responsibility by pointing out the unique opportunities, which they possess during their term of attendance, of markedly influencing the future welfare of the child.

Some instructions have also been given during the past few months in the hygiene of the pregnant woman and the nursing mother, and suitable diets to be used by them described. In some cases visits are paid to the midwife while at work. Such visits have been very satisfactory. In several instances it has proved that midwives are actually instructing mothers as advised, in others it has served to stimulate the interest of both the mother and the midwife.

It is impossible to bring forward direct evidence that the operations which have taken place under the Midwives Act have had a beneficial effect on the infantile mortality throughout the country.

The following tables, prepared to show the special influences at work in Manchester in the infantile death rate under twelve and under three months are of interest, but though it is possible that the reduction which took place during 1905 may be due in part to the increased care taken by midwives, no definite conclusion can be drawn.

Table showing the Number of Deaths of Children under Twelve Months old in Manchester from certain specified causes for the years 1895—1904 and in 1905. Also the corresponding Figures for Deaths of Children under Three Months old.

Period.	All Causes.	Seven Zymotic Diseases.	Diarrhœa.	Premature Births.	Convulsions.	Lung Diseases.	Atrophy Marasmus.
Deaths under 12 months.							
1895 to 1904 .	3253	216	594	350	167	581	555
1905 . .	2786	139	559	390	144	456	436
Deaths under 3 months							
1895 to 1904 .	1445	18	145	342	104	141	350
1905 . .	1367	11	142	384	93	113	290

The average infantile mortality in Manchester for the ten years 1895—1904 was 187, whilst in 1905 it was 159.

The reduction took place chiefly in deaths from lung diseases, atrophy and marasmus and the seven zymotic diseases, while there was a marked increase in the number of deaths from premature birth.

Although it is impossible as yet to prove statistically the influence exerted by midwives in infantile mortality, yet we must all agree that such an influence exists, and that it is a very far-reaching one. It is therefore of great importance that it should be in the highest degree beneficial. The best method of ensuring this lies in the special training of present and future midwives.

It behoves us, therefore, to consider how best this influence of the present midwives may be directed and what steps local authorities should take to fulfil the responsibility laid upon them by the Act.

In order that midwives may be able to impart definite useful information to parents, they must themselves possess the requisite knowledge and they must be able to impart it to others.

Midwives in practice at present will therefore require instruction, and in the future the trained women will also require instruction to enable them to keep abreast of the times.

The instructions given to midwives should embrace especially the branches of the work which deal with the care and cleanliness of the mother and child, and the proper dieting of both.

Such instruction could be given to graded groups of midwives by the inspector of the district, and would of necessity be essentially practical and tutorial. The instruction should be followed up by an inspection of the midwife's mode of practice, in order to see whether she was capable of adapting her knowledge to particular cases. The instruction could be given in a set of five addresses. Ample scope for these exists in a full explanation of the rules without in any way trespassing upon the work of training institutions. Inasmuch as midwives require general instructions in the rules in order to adequately carry out the special ones which directly influence infantile mortality, I now submit a course of addresses based on the rules which I have drawn up.

Address No. 1.

General duties.	
Appliances demonstrated . . .	Rule 2
Method of cleansing and disinfection of appliances and bag .	,, 4
Clothing.	
Dresses and Aprons. Washing sleeves which roll up	,, 1
Other clothing. General. Gloves. Cloaks.	
Cleanliness. General. Bath in house	,, 1
Hands and nails. Care of same.	
Precautions *re* Appliances.	
(*a*) After normal confinement and puerperal visit	,, 1

(*b*) After case with foul-smelling discharge—suspicious	Rule 1
Clothing. Hands, etc.	
(*c*) After case of puerperal fever	,, 5
Explanation why these rules are necessary. Germs—necessity for killing these. Difficulty of doing so.	
Notifications to be sent in to Local Authority.	
Deaths. Mother. Child. Action.	,, 18 (1)
Still births ,,	,, 18 (2)
Puerperal fever and other infectious diseases	,, 18 (3)
Medical records	,, 19b
Registers.	
Register of cases.	
Temperature register.	

Practical instructions given in book-keeping required.

Midwives to bring their own bag of appliances, and to wear uniform worn while attending confinements.

Address No. 2.

Duties to patient.	
Before labour — procedure when patient comes to engage midwife	Rule 17 a
(Special instructions to be given later.)	
During labour — a normal case. Demonstration of presentation with dummy	,, 12, 17b
Person of patient, preparation of	,, 7
Midwife's hands and arms, preparation of, with practical demonstration	,, 3
Few examinations to be made.	,, 8
Bed, preparation of, with practical demonstration	,, 10

Attendance constant after onset of second stage	Rule 6
Abnormal cases defined, demonstration of presentation with dummy	,, 17b
Procedure and preparation as in normal	,, 7, 3, 8 10, 6
And advising that medical aid be sent for—written message	,, 19b, 17b
Action while waiting for doctor	,, 6
Action if relatives refuse to call in doctor	,, 17
Drugs	,, 16

Address No. 3.

Duties to patient.	
After labour—immediate care	,, 10
During lying-in period—length normal—abnormal	,, 11
Cleanliness and comfort. Patient—care of—clothing (Special instructions later.)	,, 11
Daily routine, pulse, temperature—practical instruction and method of taking same	,, 17c
When to advise calling in medical aid	,, 17c
Action if relatives refuse	,, 17
Puerperal sepsis. Signs and symptoms	,, 17c, I (1, 2, 3, 4, 5)
Precautions required. Danger of mild cases	,, 5

Address No. 4.

Duties to child.	
During birth. Eyes	,, 14
After birth. Immediate danger to life; procedure to adopt	,, 9

Separation of cord. Demonstration.	
Artificial respiration. Demonstration	Rule 13
Cleanliness and comfort. Precautions required	,, 11
Abnormalities. Illnesses	,, 17c
Medical aid to be advised	,, 17c
Proper dieting, influence of	,, 17c
Breast feeding, importance of. Method.	
Bottle feeding, dangers of. Demonstration of method of preparing food.	
Artificial foods, dangers of. Starvation brands of condensed milk.	
Safest brands to use.	
Information to be given regarding feeding of child after first ten days.	
Distribution of printed slips.	
Information to be given regarding influence of dirt. Summer diarrhœa.	
What is a still birth?	,, 18, 2

Address No. 5.

Special duties to the patient.	
During pregnancy	,, 17a
Importance of personal interview.	
Instruction to be given to healthy women, *re* diet, drinks (danger of alcohol), clothing, exercise, rest, fresh air, care of bowels, skin and kidneys, care of breasts, special development of nipples.	
Preparations for the labour. Clothes for mother, child and bed. Value of maternity bag in which to collect boiled old linen.	

    When to seek medical advice. Importance of having urine tested.
  During the puerperium . . . Rule 11
    General care to be taken (Address 3).
    Instruction to be given, *re* diet (avoidance of alcohol), clothing, personal toilet, cleansing of breasts and nipples.
    Measure to adopt to relieve distended breasts.
    Care of cracked nipples.
  During lactation.
    Instruction, *re* diet, and general hygiene of mother and child.
    How to feed the child. When to wean.
    How to avoid summer diarrhœa.

Printed slips containing in detail the information to be given to mothers to be supplied to midwives. These slips to contain diets suitable for pregnant, puerperal or nursing mothers, with cost and method of cooking annexed.

Of course, such lectures could be amplified to meet special local conditions if it was thought expedient, but the essential points should not be lost sight of, viz., the tutorial nature of the class and the graded groups of women chosen to attend it.

In connection with the London County Council, evening classes for midwives have been organised. The syllabus of these lectures is more extended than that of the addresses given above. These have been drawn up, however, with the special object of making such a course part of the ordinary work carried on by the local authority.

The curriculum for pupil midwives must include a careful training in the hygiene of pregnancy and of the puerperium, and very careful instruction must be given in infant hygiene if the midwife is to be of real value in arresting infantile mortality. Special diets, with methods of cooking and cost, must be given for the pregnant or nursing mother, and minute details carefully gone into.

As the work is chiefly among women whose expenditure on food may be counted in pence, it is important that they should be instructed in the full value of the diets they advise, and use their influence to have them adopted.

It is of interest in this connection to note that during the quinquennium 1876—80, there was a remarkable decrease all over England and Wales in the death rate of young adults, and during the next quinquennium an equally remarkable decrease in the infantile death rate.

The early seventies were years of great prosperity in England, and the people were able to secure abundant food and clothing, and were comparatively free from want and worry. Their children were correspondingly healthy as shown by the death rate in the next quinquennium.

The following death rates are extracted from Dr. Niven's paper on "Dietaries."

DEATH RATES IN ENGLAND AND WALES AT CERTAIN AGE, PERIODS, AND GROUPS OF YEARS.

Years.	0.	5	10.	15.	20.	25—35.
Males.						
1866—70 .	72·9	7·9	4·3	6·0	8·3	10·1
1871—75 .	69·9	7·1	4·0	5·7	8·1	10·0
1876—80 .	67·0	6·3	3·4	4·9	6·7	8·7
1881—85 .	61·3	5·8	3·2	4·5	6·0	8·2
1886—90 .	61·9	4·9	2·8	4·1	5·5	7·4
Females.						
1866—70 .	63·3	7·4	4·3	6·4	7·8	9·6
1871—75 .	60·0	6·6	4·0	5·9	7·4	9·2
1876—80 .	56·8	5·9	3·5	5·0	6·2	8·0
1881—85 .	51·9	5·7	3·3	4·7	5·9	7·9
1886—90 .	52·0	4·9	2·9	4·1	5·2	6·9

Owing to the ignorance of the dietetic value of cheap articles of diet the money value of food is not obtained by the majority of people.

Where it is necessary to run a household on very limited means, and especially where people are living just above the verge of want, this ignorance deprives people not only of luxuries, but of actual necessities.

Pregnant and nursing women require a nourishing savoury diet, which is difficult for many of them to obtain unless they possess actual knowledge of special cheap foods and the methods of cooking these.

Now, while we cannot, perhaps, expect midwives to cook food for their patients, yet, if printed diet sheets are given to them for distribution, with detailed methods of cooking attached, a step in the right direction would be taken.

It is important that the good work done by the midwives should be carried on, and it is worthy of discussion whether local authorities, with a view to prevention of infantile mortality, might usefully employ midwives after the first ten days of life. It seems to me that this might usefully be done in four ways.

1. Weekly returns of all births attended by midwives to be supplied to the corporation on specially provided forms. Suitable remuneration to be given by the corporation.

Health visitors would then be able to visit bottle-fed babies as soon as the midwife ceased attendance, and to visit all very soon.

2. Through literature distribution by the midwife during her term of attendance to mothers under her care. Such literature to deal specially with the diet and general hygiene of the mother and child during the first year. The literature to be explained by the midwife.

3. Through preparation of the parents by the midwife for the reception of advice to be given by the health visitor of the corporation.

4. Midwives might act as bureaux of information to health visitors *re* special cases.

It is at the same time necessary that the limitations of midwives must not be lost sight of.

Misdirected energy is lost energy, and unless great care be exercised to develop midwives only for the work which their training fits them, much of the value of the Act of 1902 will be lost.

During the first ten days after labour the midwife is able to give such help and instructions as is necessary to ensure that the mother fully understands the proper care required for the well-being of herself and the child during the next few months.

Without undergoing a much more expensive training than the one at present required, midwives are not competent persons to give uncontrolled advice in questions affecting the life of the child after the first ten days. Moreover, it cannot be supposed that such advice would be given without payment, and it appears inadvisable that parents should pay midwives when medical practitioners are the proper persons to employ.

I am indebted to Dr. Ballantyne, of Edinburgh, and to Dr. Kidd, of Dublin, for an account of the work done by midwives in Scotland and Ireland.

In Scotland very few women act as midwives, and the general opinion of obstetric teachers and practitioners is that there is nothing like the same need for legislation as there was in England.

At the same time, however, a Scottish Examining Board for Obstetric Nurses was started about three years ago, and quarterly examinations have been held.

The training required is six months' maternity hospital experience, or three months' experience after three years of general training.

In Ireland the conditions vary according to the district.

In Dublin, where women are often attended by midwives, apart from the cases attended by the lying-in charities, the work done is good. The women are usually sufficiently well trained and honest to call in assistance whenever abnormalities arise. These midwives have received the excellent training given in all the lying-in hospitals there.

The district nurses scattered throughout the country have also in most cases had their midwifery training in Dublin and do good work, but in the north and throughout the country districts it is probable that the handy woman still attends many cases.

I regret I am unable to give detailed information regarding the practice of midwives in these countries. So far as I know, no record is kept. It is thus impossible to gauge their influence on the infantile mortality. It is practically certain, however, that unless legislative measures regulate their practice, scanty care of the infants whom they attend will be taken by many. I therefore consider that legislative measures which proceed on the lines of the English Act would have beneficial results.

I have attempted to review rapidly the conditions which exist under the Midwives Act, 1902, throughout England generally. In order to give prominence to the special conditions existing in industrial centres where the infantile mortality is high, I have described in detail the position of affairs in Manchester.

While it is impossible at present to prove definitely that the influence on infantile mortality exerted by midwives throughout the country is beneficial, yet it cannot be doubted, in view of the figures quoted, that it is a very far-reaching one and of great potential value.

It is desirous therefore that an energetic and enlightened policy suited to the particular needs of the district should be pursued by local authorities, as the Midwives Act has provided machinery which will become more and more valuable in connection with the steps taken to arrest infantile mortality.

Dr. Chalmers (Medical Officer of Health, Glasgow), said: There is only one paragraph in Dr. Smith's most excellent paper to which I should like to revert, and that is, where she expresses the opinion, held by others it is true, that the extension of the

Midwives Act to Scotland is unnecessary. In a general way it may be true that women in Scotland are attended by medical practitioners more frequently during childbed than is the case in certain parts of England, but I am in a position to show that in certain districts of Glasgow the proportion who are so attended is not only small, but that the proportion attended by women of whose training we have no knowledge is very considerable. Thus I have before me information regarding 309 consecutive births occurring in thirteen weeks of the present year in that part of Glasgow known as Cowcaddens. All the proportions there show how necessary it is that the provision of trained attendants during this period is urgently needed.

GLASGOW.—NATURE OF ATTENDANCE AT BIRTHS IN COWCADDENS WARD DURING THIRTEEN WEEKS ENDING JUNE 2ND, 1906.

Week Ending.		Doctor.	Maternity Hospital Nurses.	Other Schools for Nurses.		Woman.	Poor house.	Not Visited or Found.	Total.
March	10	7	—	1	5	12	—	4	29
,,	17	4	4	3	5	12	—	—	28
,,	24	7	—	2	7	13	—	—	29
,,	31	7	1	1	5	8	—	1	23
April	7	11	2	2	4	4	1	—	24
,,	14	6	1	—	5	9	1	—	22
,,	21	6	—	—	5	9	—	1	21
,,	28	6	—	2	3	11	—	1	23
May	5	5	1	—	2	11	—	—	19
,,	12	2	1	1	5	5	—	—	14
,,	19	8	—	2	6	14	1	—	31
,,	26	5	1	2	4	9	—	2	23
June	2	5	1	1	4	9	—	3	23
		79	12	17	60	126	3	12	309
Percentage		26	29			41	—	4	—

This return shows that little more than a fourth of these cases were attended medically, that 29 per cent. were attended by nurses from various training bodies, and that, on the other hand, no less than 41 per cent. were attended by women of whose training one knows nothing. Indeed, they are mostly of the type known as the "handy woman," a phrase which has passed into common use in Glasgow to express the calling of one who may for hire or through personal interest attend confinements.

These figures, limited as they are, strongly suggest the need for extending to Scotland the advantages which Dr. Merry Smith has shown to follow the operation of the Midwives Act in Manchester.

The conference formally agreed to express the opinion that the Midwives Act, 1902, should be extended to Scotland.

The Chairman.

Councillor W. Fleming Anderson proposed a hearty vote of thanks to Mr. Alderman Evan Spicer for presiding over the conference. He said that much of the success of the proceedings was undoubtedly due to the urbanity and tact of Mr. Spicer, who, although one of the busiest men in London, had given them two days of his valuable time.

The motion was carried with acclamation.

Alderman Evan Spicer, in acknowledging the compliment, said that he felt it was due to London that he should accept the chairmanship of that conference, the results of which he believed would be most useful. Resolutions had been passed which he believed the Government would receive and consider. The question of still births, which had been dealt with, he regarded as particularly important, and if they could get the Government to legislate in reference thereto, that conference would certainly not have been held in vain. Then, too, the suggestions thrown out for limiting and reducing married women's labour would also bear fruit, as they deserved to do, for any improvement in that direction would be of the greatest benefit to the motherhood of this country. He keenly felt the importance of feeding mothers and their children, because this was a direct question of saving life. He was Socialist enough to say that a hungry mother and child should be fed. They might punish the father and husband for neglecting his responsibilities to his family, but let them not leave the mother and children hungry whilst they were trying to bring the responsibility to the father. He warmly thanked them for his kind reception, and congratulated the delegates on the undoubted success of the conference.

Resolutions.

Resolution on Dr. Niven's Paper.

1. That the Education Department be urged to add instruction in elementary hygiene with reference to the dietary and rearing of infants to their present scheme for systematically training girls in the senior classes in the practice and principles of personal hygiene and the elements of dietary.

Resolution on Dr. McCleary's Paper.

2. That, in the opinion of this conference, immediate legislation is required enabling Sanitary Authorities to establish or support depôts for the supply of pure, or modified, or sterilised milk, and to defray any cost out of the monies available for public health purposes.

Resolution on Dr. Kaye's Paper.

3. That, in view of the information submitted, the conference is of opinion that all still births should be notified within 48 hours to the medical officer of health of the district in which they occur, and that no burial should take place without a medical certificate.

Resolution on Mayor of Huddersfield's Paper.

4. That notification of all births be given within 48 hours to the medical officer of health of the district in which they occur.

Resolution on Councillor Anderson's Paper.

5. That, in the opinion of this conference, the question of the insurance of infant lives under twelve months is one demanding serious consideration, and, with a view to receiving reliable information, the Government should be asked to appoint a Departmental Committee of Inquiry on the whole question.

Resolution on Dr. Geo. Reid's Paper.

6. (*a*) That the period of one month's abstention from factory work away from home now imposed on mothers be extended to at least three months, and that, on their return to work, evidence must be produced satisfactory to the local authority that proper provision has been made for the care of the child.

(*b*) That no employer of labour shall permit a woman advanced in pregnancy to engage in factory labour unless her ability therefor has been certified to the satisfaction of the local authority.

Resolution on Papers by Dr. Moore and Dr. Greenwood.

7. (*a*) That, having regard to the ascertained fact that in centres of industries where women are largely employed away from their homes, an excessive number of deaths of infants takes place, and that this is contributed to by the improper conditions existing at the houses in which infants are placed out to nurse, it is necessary that the persons by whom and the places into which infants are received should be under supervision by the local sanitary authority.

(*b*) That the Infant Life Protection Act be amended to remedy abuses which are not at present provided against.

Resolution on Dr. Knight's Paper.

8. That all preparations offered or sold as food for infants should be certified by a Government analyst as non-injurious, and that each packet should contain its analysis.

Resolution on Dr. Chalmers' Paper.

9. That the Dairies, Milkshops, and Cowsheds Order is defective, and that any amendment should extend the definition of disease as applied to animals, and should make the provision of regulations by local authorities compulsory. That the scope of the regulations should be extended to cover dirty milk, and should enable local authorities to prohibit the sale of any milk which fails to comply with the conditions of purity agreed upon.

Resolution on Dr. Spottiswoode Cameron's Paper.

10. That in the opinion of this conference the appointment of qualified women specially trained in the hygiene of infancy is necessary as an adjunct to public health work.

Resolution on Dr. Merry Smith's Paper.

11. That in the opinion of this conference the Midwives Act, 1902, should be extended to Scotland and Ireland.

At the close of the conference it was unanimously agreed:—

> That the conference resolve itself into a committee to give effect to the foregoing resolutions, and with power to remit to an executive committee to carry out the same.

A PERMANENT COMMITTEE.

THE MAYOR OF HUDDERSFIELD said that there was a general feeling among the delegates that the conference should not exactly end where it was, and that the work so well begun should be continued. He therefore moved: "That the delegates and members of this National Conference resolves itself into a National Council for the Prevention of Infant Mortality, and that the committee and executive committee of this conference constitute the committee and executive committee respectively of the members of the National Council, with power to add to their numbers." That would enable the work to continue, and if necessary enable the full conference to be called together again on some future occasion. It would be a pity for the gathering to break up without taking some action of that character.

DR. J. M. RHODES (Chorlton) cordially seconded the motion. It was right that England should have such a conference, for public opinion was behind it. Other countries had similar organisations.

In reply to questions,

THE MAYOR OF HUDDERSFIELD intimated that lady doctors and other ladies holding representative positions would be co-opted members of the executive committee in due course.

The motion was unanimously carried.

DR. RHODES moved a vote of thanks to the officials for the admirable manner in which the conference arrangements had been made.

SIR HENRY LITTLEJOHN seconded the motion, which was agreed to.

The compliment was acknowledged by the LORD PROVOST OF GLASGOW and MR. COUNCILLOR ANDERSON, the latter remarking that the conference had been started without any data to go upon. They now had much information which would enable them to continue the work in a more satisfactory and thorough way, while special attention would be given to the woman's side of the question.

A vote of thanks to the Westminster City Council for the use of the hall closed the conference.

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